

MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—ON PHYSIOLOGICAL EXPRESSION IN PSYCHOLOGY.

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THE thoroughgoing concomitance of Mind and Body is here taken for granted as being all but universally allowed. The question, however, still remains how far the study of bodily organs and processes is of avail in psychological inquiries. Nobody maintains that these organs and processes can be entirely left out of account; they never have been and never can be so treated. Expressions are sometimes used incautiously that would seem to contend for the total neglect and dismissal of the physical side. Dr. Ward remarks that psychology knows nothing of muscle and nerve; yet the dying Emperor Hadrian, in the farewell address to his soul, cannot refrain from regarding it as *hospes comesque corporis*. Mr. Stout (*Proc. Aristotelian Society*, i. 1) argues the pros and cons with much minuteness, and decides as follows:—“As regards present achievement, I am disposed to assert that the help which psychology has received from the physiology of the brain is even less than the little which the physiology of the brain has received from psychology”. Mr. Bradley, in discussing the important question of the psychical origin of our sense of activity (MIND xi. 321),

refuses to accept any considerations derived from physiology. In such a question, one extreme may be as bad as another. Those that refuse all possible aid from physiology to psychology, have overlooked the lengths whereto we are already committed in the physical rendering of psychical facts. What they dwell upon most particularly is the very little that we know of brain-workings. Now, undoubtedly, it is true that we know little of those workings, but it is not true that we do not know anything. Moreover, as will be seen afterwards, the workings of nerve and brain are incontinently referred to in the common modes of speaking of mind. But the objectors to a physiological rendering of mental facts would find themselves involved in much deeper contradictions with usage, if, instead of speaking of nerves, they would refer to organs of sense and movement. The help rendered to the classing of our Sensations in their proper psychical character, has never been refused to psychology since Aristotle; while to reject all consideration of Movement would require the treatment both of Emotion and of Will to begin *de novo*, and the attempt would infallibly break down.

It would seem, then, that an inquiry into the exact limits of the reference to the bodily functions, in speaking of the mind, has still to be made. The facts involved cover a wide area, and the illustration must be proportionally wide.

One very important clearance of the ground consists in a review of the psychical vocabulary, its character, and sources. The mixture of the psychical with the physical is such as to prove that mental processes, however distinct from bodily processes, have never owned even a vocabulary of their own.

Survey of the Vocabulary of Mind. A glance at the existing terminology of mind will easily show how it has been made up, and how indispensable material accompaniments have been in the process. The vocabulary, in its greater part, is due to the Greeks and Romans, although every people possessed of a language has supplied some of the names. We see that these names were, in the first instance, purely material; while, by exclusive appropriation to mental facts, many have more or less completely parted with their material signification, and suggest only the subjective meanings. Take as a few examples, *spirit, recollection, conception, intuition, emotion, irritation, impression, expression, sentiment, excitement, conscience, comfort, sympathy, delight, memory, discrimination, relativity, images, ideas*. This class of words may be regarded as faded or worn-out figures of speech—metaphors or metonymies of material origin: while,

to all intents and purposes, they are now mental or subjective; so that when they are used we are not led to any material meaning, least of all to any definite physical accompaniment of the mental state. Another class of names, also applicable to mind, still preserve their material meaning; that meaning being in some instances the strict material accompaniment. Such are the terms—*move, elation, life, trembling, grief, hatred, soothing, restlessness, blush, sore, wound, sleepy, scald, fever, agitation, commotion, staring, smiling, frowning, shock, throb, tension.*

A little examination will divide those physical accompaniments, that have been adopted also as names for mental states proper, into emotional adjuncts and voluntary adjuncts; that is to say, some are the expression of the emotional wave, as *smile, frown, tremble, blush, shock*; others give the voluntary act consequent on feeling, as *stretch, strain, pursue, avoid.* There is nothing illegitimate in either class of words; the material application does not detract from the propriety of the mental. What is more, it is an actual help and support. In order to conceive mental states with anything like clearness or force, we need all the suggestiveness that their well-known adjuncts can provide. This is a point now to consider.

Cases where the Material Adjuncts are helpful. Perhaps the most remarkable of these cases is the sensations of the five senses. In classifying, describing, and studying these sensations, we are very much aided by the study of the physical organs. Unnoticed shades of sensation can be suggested by these, while subjective characters can be confirmed by the known objective distinctions. It has never been proposed to go fully into the special sensations without reference to what physiology tells us of the organs; while, on the other hand, the subjective distinctions, when unusually well marked, furnish a clue to the physical or objective embodiments. Instances of this will occur as we proceed. So it is with the expository delineation of the different sensations within each kind of sense; a little knowledge of the physiology prepares us for imbibing and comprehending the psychological classes.

It is needless to make a parallel illustration from the Emotions, where the double language of mind is so useful and acknowledged.

Hypothetical Views aid Expression. Our knowledge of the nerve-processes, although not to be despised, is un-

doubtedly imperfect and leaves a great deal to be desired. Consequently we may not make use of it as a basis of subjective laws, or as carrying us much farther into the arcana of mind than we can go by help of subjective indications. Our analysis of memory, reason, and imagination, cannot be said to be suggested or confirmed by the physiology of the brain. But there is also another side to the case. If a subjective language were in existence adequate to cope with all the nice intellectual situations, we should not be justified in bringing in nerve-processes of a purely speculative kind. There are, however, a number of situations where expression is imperfect, inadequate, and unsteady; and for such situations a merely hypothetical supposition may be helpful, while it need not be abused.

Admitting the necessity of mixing material phraseology in the expression of the mind, we must, of course, observe the precaution of not giving the one as a substitute for the other; but ordinary care is usually sufficient to avoid this error. In the exposition of the mind, not only should this substitution be avoided, but a reasonable proportion should be observed in using the two vocabularies. The best mode of guarding against either subjective or objective excess in the terminology would seem to be to set forth every mental fact, first, under its known physical accompaniments, including convenient hypothetical adjuncts, and, next, in its purely subjective delineation. This done, we can survey the observed proportions and adjust them as we judge best; while it will be open to the critic to take exceptions to any undue fulness or irrelevance on either side.

The objectors to the use of physiological theory in dealing with mental processes dwell chiefly upon the intellectual functions; whereas if they were to attend more particularly to the senses, the emotions, and the will, they would have to change their language entirely. No man will ever discuss these departments without making a very large use of the terminology of the material accompaniments. It is simply a question of greater or less reference; it is not a question of subjective purity of treatment. Aristotle made the first commencement in the way of physical reference; his delineations of the physical side were crude in statement, but he did not err in principle. It is in the detailed exposition of these several departments of the mind that the question may be advantageously raised as to the suitable amount of physiological description in each particular case. The theory of Pleasure and Pain which governs

both the emotions and the will has long adopted a physiological embodiment, and the advocates for subjective purity should say precisely whether this is wholly illegitimate, whether it is excessive, how far it should go, and where it should stop. This may be propounded as a fair test of the sincerity of the subjective purist. In point of fact, it would help to solve what is a genuine problem not as yet solved by anyone, namely, to draw the line between the use and the abuse of physiology in the psychological region.

What I conceive to be inadequate reference to physical accompaniments may be illustrated from Mr. Stout's paper "On the Scope and Method of Psychology" (*Proc. Arist. Soc.*, i. 33). I give a few of his expressions as follows:—

"We must assume that every mental event is connected with a *neural* event;" "we are compelled to consider these *neural* occurrences which are immediately connected with mental occurrences, not as antecedent to those, but as concomitant with them." "What then is the value and import for psychological science of those neural accompaniments of mental events? I answer that from a purely theoretic point of view psychology is not bound to take any account of them whatever." "We have, in conclusion, to consider whether it is practically convenient to discard data which may be supplied by the physiology of the brain." "For example, the endeavours which have been made to find a material correlate to the association of ideas do not really advance the science of mind a single step."

My first observation upon these statements is that, under them, the only connexion of mind and body that is proposed to be taken into account is the connexion of mind and brain or the nerves. We should never know from Mr. Stout's observations that mind was accompanied with organs of sense, with organic processes, and with the muscular organs. My next observation is that the use of referring to bodily organs and processes is too much narrowed by his mode of putting the case. I propose to confute this narrowness from his own mouth, but I shall first avail myself of the following sentences from Dr. E. Montgomery (*MIND* x. 386):—

"Now, as the veritable powers which have established the definite bonds between sensorial affections are themselves extra-mental, it is not likely that we should be able exhaustively to study the laws of perceptual combination by mere mental operations, unaided by experimental reference to the permanent source of stimulation and union which they represent. Who, indeed, finds himself ever thinking of feelings of touch without also calling into mind the organ of touch together with some touched object, or sets about invoking normal muscular feelings as perceptual building-material without presupposing actual muscles?"

This is precisely my contention, and my surprise is that there should be any occasion to make such a very patent remark. I will now quote another passage from Mr. Stout on a purely psychological question, *viz.*, the ultimate distinction of the Primary Mental Functions (*Proc. Arist. Soc.*, i. 142).

"The unity of the individual consciousness seems to depend on the successive salience and dominance of special presentations which constitute in turn the focus of the total mental activity from moment to moment. This is expressed in ordinary language by saying that we can only think of one thing at a time. Now the successive dominance of a single presentation, which gives systematic unity to mental process, depends on motor activity. Out of the multitude of impressions which are continually soliciting our senses, this or that special one is singled out by muscular adaptation of the organs of sense, by vaso-motor action, causing increased blood supply to special parts of the sensitive surface, and perhaps by outgoing currents passing along the sensory nerves from centre to periphery. The concentration of attention on ideas seems to be effected by a similar mechanism. Thus the unity of consciousness, and therefore the very existence of consciousness, depends on the focussing of presentations, and the focussing of presentations depends on motor activity. Hence motor activity is a necessary condition of the existence of consciousness."

It will be observed that the writer of the above, after devoting three sentences to subjective expression, leads off on the concluding phrase "motor activity" into the profuse employment of physiological language which I have here signalised by italics. It seems to me that he is quite right in doing so; that the language he employs is a relevant citation of the physical side of his subjective thesis, and that he has been urged, notwithstanding his theoretical aversion to the physiological reference, to make use of it as somehow assisting his conception of the subjective fact. Evidently, his refusal of physiological assistance was stated too exclusively in terms of nerve and brain, as if these were the only important bodily organs connected with the mind. Thus, to take his testing example—the material correlate to the Association of Ideas—it is perfectly true that the nervous processes accompanying association are very imperfectly known, even if they can be said to be known at all. But this is not a fair statement of the question as to the physical accompaniments of our intellectual processes. Instead of association of ideas, let us put the case of Memory or Retentiveness, one of the fundamental facts of our intelligence, and ask whether our knowledge, such as it is, of the physical accompaniments be wholly irrelevant. Do we in describing the operations coming under this head, such as acquisition

of knowledge, formation of habits, entirely and at all points exclude bodily accompaniments? It is no doubt the case that we largely make use of a subjective terminology, and that we can state the chief conditions of retentiveness by this means; for example, the two great essentials of repetition and mental concentration can be given without making use of physical language. But we very soon come to know, and it always has been known, with more or less precision, that bodily freshness and bodily fatigue play a vital part in the success of our endeavours. Now, while I doubt whether this condition could be expressed subjectively, it is quite certain that it never is so expressed. There are other conditions equally beyond purity of subjective statement. Thus, in order to impress the memory of a pupil with a given exercise, it is very desirable that the teacher's statement should be, in point of articulation, sharp, deliberate, and distinct, while the pupil should have his ears in such a condition of alertness as to receive the statement with effect. These conditions, I contend, are eminently physiological, although not what would be called profound physiology. I repeat, therefore, that the outworks of sense and movement, and the general tone, are to be taken into account on the physical side as much as the more inscrutable recesses of the cerebral convolutions.

I will now turn to Mr. Bradley (MIND xi. 321), who is even more emphatic than Mr. Stout in his assertion of subjective purism in psychology. He is attacking a position almost the same as Mr. Stout in the passage last quoted, *viz.*, the psychical origin and character of Attention or our sense of Activity, and, after discussing the point subjectively, he adverts, in concluding, to the supposed physiological argument that might be adduced by way of confuting his view. This leads him to say what he thinks on any or all attempts to bring physiology to bear upon mind.

"But such a question as the existence of a psychical activity is a matter which falls outside physiology. We might get from that science instruction valuable and, in some particulars, even necessary; but suppose that we knew (as I presume we do *not* yet know) the physical side of the psychical process, is it certain that about the main question we should not be precisely where we are now? For in the first place the existence of this or that feeling could hardly be deduced from physiological premisses if actual observation were unable to find it. And in the second place between a process in the brain and a consciousness of energy there is really a gulf which is not to be filled up. You may know from experience that they are found together, but, given the first, you could never have got to the second, and they remain in the end quite heterogeneous."

For my own part, I take leave to doubt the irrelevance and the uselessness of all physiological reference in this very question. I venture to think that Mr. Stout followed a sounder instinct, against his own theory, in making free use of physiological terms for substantially the same problem. When we talk of our activity—talk of ourselves as active beings—the first thing that we have to look to is the active apparatus of the body, as known by the name of the muscular system. Every act of bodily attention involves, in the first instance, some specific muscular acts; and when from the sphere of actuality, as in the employment of the senses, we pass to the sphere of ideality, the point is forced upon us whether or not this is still muscular activity in a transformed character. Evidence is adducible for, or against, the hypothesis. So much is to be said in its favour, that the opposite appearances are merely certain remaining difficulties that may possibly or probably be removed. Now when we have carried into the mental sphere our muscular agency under a new guise, we have found a genuine physiological activity, the interpretation of which has a decided relevance upon the psychological discussion. It may not be conclusive, but it is highly suggestive, and is at least an aid to us in stating the problem; and, as is often said, a problem well stated has already gone some way towards being solved. Moreover, if mental attention is not bodily attention idealised by being thrown more exclusively inward upon its nervous tracks, there is still to be sought within the compass of the system a factor of activity at present entirely unstateable. We cannot too soon set going an inquiry to find out what this is.

To meet the challenge, so often made, to produce any laws of connexion between the physical and the mental such as to throw light upon the workings of mind, I will refer more particularly to the Feelings and the Will, where the most conclusive illustrations can be adduced.

We cannot do better than advert to the great thesis of Pleasure and Pain, as such, with their results in determining volition. On this subject Mr. Bradley has an exceedingly elaborate and exhaustive paper (*MIND* xiii. 1), to which I will at present refer no farther than to take note of his mode of handling the undoubted and well-known physical accompaniments of our hedonic states. I venture to suggest that, if he adhered strictly to the view formerly quoted, he would never mention the physical side at all; or at least he would justify the use he makes of it, and admit that psychology,

on certain occasions at least, does well to bring in the aid of physiology. The example may be taken as a testing case of the employment of physiology, and as an opportunity of judging whether it is profitably or unprofitably cited.

Pleasure and pain are without doubt psychical states, and may be studied or contemplated purely as such. But when we wish to theorise upon them, so as to give a full account of all their important bearings, we find ourselves obliged very soon to advert to their physical causes or conditions. Thus, Mr. Bradley, while opening with a purely psychical inquiry, *viz.*, as to the connexion of pleasure or pain with Sensation, and with the Ego, proceeds to ask for their *physical* conditions. He discusses, and considers the discussion legitimate, how far pleasure corresponds with physical benefit and pain with physical injury. Then he inquires what are the strictly *psychical* conditions of pleasure and pain, *i.e.*, their connexion with psychical activity. His conclusion is, that there are conditions that are not psychical, as well as those that are. His most comprehensive conditions, which he develops at length, are harmony and expansion, which conditions he traces throughout in their double aspect of the physical and the psychical. In all this, I regard him as on the right tack; and I accord to him the further compliment of keeping the two sides distinct and apart in the course of his whole discussion, thereby complying with what I consider the chief propriety to be enjoined in the handling. So far he has done all that I have ever contended for, in regard to the inclusion of a reference to the physical side. Yet, even on psychical grounds, I believe he ought to have greatly widened his basis of examples of pleasure and pain. On the one hand, he should have dwelt more fully on the primary feelings connected with sensation, as well as the more elementary emotions; and on the other, he should have expounded more fully the higher æsthetic and other aggregates of emotion. His choice of examples is not even fairly representative of the difficult cases. It is not my purpose to enumerate those deficiencies at length, but the present argument makes it proper to cite one notorious department of our pleasurable and painful sensibility, I mean the region of stimulating drugs—alcohol and the rest. No one can enter upon the mode of action of these drugs without being thrown at once upon physical considerations. That they are physico-chemical agents affecting the constitution of the substance of nerves, and in that capacity bringing about mental exhilaration, is sufficiently plain, although the minute atomic changes are not precisely formulated. These drugs teach us

by a startling example, which many other facts contribute to support, that the physical constitution of the nerve-substance is a paramount condition of our sensibility, pleasurable or painful. The nourishment, exercise, exhaustion, depletion, chronic deterioration, of the brain, as a physical and chemical compound, form a body of received doctrine, both theoretical and practical, which no amount of squeamishness as to *neural* accompaniments to psychical processes will ever displace from the hold it has gained. Moreover, the dependence thus established by the leading example of stimulants and their consequences will suggest the application of the chemical view to such cases as the sweet and bitter in taste, as at least of equal value with any of the other hypotheses.

I propose now to widen the issue, so as to make the illustration of the use of the physical side more comprehensive, thereby vindicating its importance for the purposes already stated. The lowest step in the gradation of its employment is perhaps simple parallelism of psychical and physical processes without obvious advantage to either. Where a psychical region can be fairly and fully analysed by psychical introspection, we might rest contented, and say nothing of physical accompaniments. Still, there is a certain satisfaction in being able to assign, at the same time, a concurrent series of physiological organs and processes, and it is a matter of choice whether or not we care to have these adduced. Perhaps the Reflex Operations of the mind might be quoted as a case in point; it being possible to classify and describe those processes, not certainly without physical references, for they all consist more or less of conspicuous bodily movements, but without special reference to the nerve-centres that are their known seats in the cerebral system. I will not argue this point further, but will go on to less equivocal examples.

The sensations of the Special Senses have been already referred to. They are of course very numerous, very distinct, and all-important both for Feeling and for Intelligence. They constitute a vast psychical mass, which we might study on the purely psychical or introspective side. We might, in the interests of purism, refuse to take any notice of the bodily organs that are associated with them. Can any one point out what would be the positive gain of this affectation of purism? It is much more easy to assign the loss. By taking the physical organs in separation, we can, in the most compendious manner, exhaust the modes of

sensibility under each, and can thus arrive at a wide and orderly view of this great multitude. Nay more: when we look minutely into the anatomy of the several organs, we obtain further helps to the subdivision and distinction of the individual sensations. By tracing tactile nerves in the tongue and in the nostrils, we discriminate the feeling of tactile pungency from the characteristic sensibilities of taste and smell.

The special senses further exemplify the utility of the physical side as a *handle* to the mental. We have already seen the difficulties in obtaining an adequate subjective vocabulary for the immense detail of our psychical experience. For this vocabulary, the physical accompaniments are largely invoked and are found to answer the end. In connecting the special senses with their several organs, we are under no temptation to confound mental and physical facts, while the physical fact helps us to realise, to retain, and to reproduce, the mental. We distinguish the two great elements of visual sensibility by the muscular and the retinal portions of the eye; and no conceivable harm arises from thus intruding the purely material adjuncts of our vision. It is needless to pursue the illustration. Usage has lent its all-powerful confirmation to the combination of the mental and the physical in this part of the mind.

We will next cite the Organic Sensations, touched on already, as being still more forcible in argumentative value for our general thesis. Here we have an enormous mass of sensibility, affecting profoundly our entire well-being. Psychically, there is not here the same easy discrimination of the different kinds as in the five senses. Yet, the distinguishing and classifying of these sensibilities make an important part of mental science, and yield the greatest practical consequences. Now, without the clue that a knowledge of the several organs furnishes, such an analysis must needs be very imperfect. In point of fact, all the attempts to make the discrimination have been more or less guided by the connexion with distinguishable organs. The stomach and the lungs perhaps take the lead in giving distinctness to the departments of sensibility associated with each. The muscular system, viewed as an organ liable to changes in nourishment, fatigue, exhaustion, physical injury and derangement, has also a distinguishable class of sensibilities.

The reference to the Muscles opens up the much discussed question of the physical side of our subjective sensibility to pressure, strain, and active exertion in every form. This

case is illustrative, in a way of its own, of the value to be attached to the study of physical concomitance in mind. It so happens that, in this region, the subjective analysis is self-sufficing, that is, independent of hints or confirmation from the physical side. It will probably be admitted by all the disputants on such a well-threshed question, that subjectively we can establish as distinguishable modes of consciousness the following series of states of feeling :—Sense of energy expended, pleasure of muscular exercise, pain of fatigue, pleasure of repose, pains of morbid states, as cramp, not to speak of minuter variations of those leading modes of sensibility. Now, working upon the usual analogies of the senses, where we can generally assign to each important variety of sensation a local seat, there would be a propriety in assigning some distinct mode of stimulating muscle to each of the several classes now enumerated. One hypothesis connects the sense of energy with the out-going motor current ; while the pleasures and pains of exercise and repose, which can be best viewed as passive sensation, would accompany the in-going sensory current through the sensory fibres of muscle ; to these might be added any known adjuncts of sensation from the peripheral parts involved in muscular action. There would be a certain congruity with the subjective facts in this mode of assigning the concomitance ; yet its verification would not add to the evidence of our subjective analysis, and its overthrow would not impair the validity of that analysis. We cannot quote this instance as even particularly illustrating the use of a physical hypothesis in supplying subjective expression. We derive all the benefit of the physiological reference by using such objective terms as muscle, motion, action, rest, without committing ourselves to the concomitance of our feeling of energy with the out-going current.

The powerful influence of changes of Temperature would have to be adduced in an exhaustive rendering of our organic sensibilities. While the feelings connected therewith are of the most commanding kind, the physical concomitance is too palpable to be ever overlooked ; and whatever contribution physiological researches may make towards explaining its mode of action throughout the body, will be adopted by the psychologist in his rendering of the subjective states.

Under this same head we need to adduce the nervous substance at large, which, in its own nature, goes through all the phases of nutrition and exhaustion, exercise and repose, health and disease, integrity and injury. No doubt the organs of nutrition and purification generally are concerned in maintaining the good condition of the brain and nerves,

with all that depends upon these. Still it is possible to assign mental states in more direct connexion with the nervous substance as such, while it would be impracticable to conduct the analysis without assistance from what we know of the physics of nerve. In spite of the mingling of all the organic functions in the general physical tone of comfort or discomfort, elation or depression, there is no mistaking the characteristic sensibilities of the stomach, the lungs, or the muscles, and to a certain extent, the brain and nerves also. We do not need at this stage to penetrate the deeper arrangements of the cerebral centres, their nerve-plexuses, and complicated distribution of nerve-fibres; all this remains over as a distinct inquiry, to be judged apart.

Connected with the physics of the brain is the important state designated under the name *excitement*, with its opposites *quiescence*, *languor*, *repose*, *drowsiness*, *sleep*, and *insensibility*. With all this mental gradation, there is an accompanying physical gradation, which can be expressed in physical terminology, and cannot be adequately stated without that help. The physical symptoms are prominent and conspicuous to the eye of the observer, and are part and parcel of the received modes of stating and conceiving the mental facts. We know the organs and processes that participate with the brain-action in the various degrees of conscious intensity. In ignoring these, we should lose much and gain nothing. In fact, if we were prohibited from noting the physical aspects of this department of sensibility, we should surrender the study of it altogether, at least as a branch of psychology.

Inseparable from sensation is the general discussion of Pleasure and Pain (to which I have already adverted in another connexion), although the thesis must be considerably widened in order to attain its full compass in the mind. At what point, or in what connexion, it should receive comprehensive discussion is a matter for consideration, and may be decided in different ways. What we are here concerned with is the well understood connexion between known physical processes and a very large number of both pleasures and pains. I have already had occasion to allude to this involvement, and have noticed how unavoidable is the introduction of the physical side in anything approaching to a thorough investigation of the most general laws of our sensibility in this respect. I will now carry the illustration a step farther by citing the theory of the Will, in which Pleasure and Pain operate as the motives, and our muscular organs

as the instruments. It is true that a very large portion of our voluntary activity can be stated in an almost purely subjective terminology. This, however, does not apply to the overt forms of voluntary action, which are the essential forerunners of the deeper modes where subjectivity is most fully exemplified. We may, at this stage, leave out the physical side of the pleasure or pain that is the motive, but the resulting activity is physical or nothing. Now the theory of the Will may be a subjective theory to this extent, that we may simply state as generalised facts that Pleasure moves us in one direction (*viz.*, for its own conservation or increase) and Pain in another direction (*viz.*, for its removal or abatement). This is to confine ourselves to strictly subjective affirmations. We may, by full examination of facts, improve upon these generalities as so stated; we may add to their precision in every way by needful qualifications and limitations, so as to meet the various complications of the problem. All this is proper to be done, and ought, on no account, to be dispensed with. There is, however, a physical aspect that may also be entered upon, but should not be jumbled up with the other aspect. It should be given quite apart, and have its value put to the test, according to the requisites imposed upon physical theories.

The kind of speculation now supposed would consist in seizing hold of pleasure and pain by their known physical aspects, and inquiring whether, physiologically, there is any natural sequence between those and the activities that follow on pleasure and pain as disclosed by subjective introspection. For example, if pleasure is associated with the furtherance of vital energy and pain with its depression, there would be a physical link between pleasure and increased activity, and between pain and the failure or diminution of activity. This is a hypothesis and nothing more. It may be shown to have a certain range of application, while it has apparent and obvious shortcomings. The question may fairly arise in connexion with such a hypothesis—does it amount to an abusive application of the physical side? I think not, if due precautions are observed. I admit that the theory of the Will must rely, in the first instance, upon subjective sequences. In the settlement of these we should scour at large over the wide region of subjective experience. We should be able to present an unbroken array of purely mental instances, as it is possible to do without further allusion to the physical than is required by the character of the active instrumentality. When all this is done, it is open to us to see whether a concurring line of physical

causation may be assigned for any portion of the facts. It is perfectly clear that, for this region at least, the psychical is the fact most immediately within our comprehension. The physical on the other hand is hazardous and hypothetical, but perhaps not entirely without relevance. Even if only a link here and there is fairly assignable, yet if that link has anything to be said in its favour it may chance to aid in settling some of the doubtful transitions in the psychical series. We cannot know this till we try: the attempt is worth making; and, if it fails, we simply remain where we were. One advantage at least may be claimed for this and for every other like attempt, *viz.*, that it keeps us fully alive to what is involved in a physical hypothesis, shows us the propriety of reserving its consideration, and consequently of carefully excluding every item of the physical from the psychical study. This in itself is no small advantage. Not only so but it is the sole conceivable method of avoiding the muddle that the purists complain of.

The problem of Evolution has now found a *locus standi* in science generally, and in physiology and psychology particularly. Although but a hypothesis, it is a hypothesis that has thrown its fascination over scientific inquirers. It crops up everywhere in connexion with the mind, and with the region of Will in a prominent fashion. The physical consequences of pleasure and pain are a two-fold activity—Expression and Volition. It is debated whether, in evolution, expression be prior, and volition posterior. For the more practical uses of psychology the speculation is unimportant; it ranks in value with the analyses of Space, Time, Cause, Unity, &c., into their psychological elements and beginnings. Now, for verification of any hypothesis as to priority between the two forms of the physical outcome of feeling, introspection is powerless. The sequence must be taken on the physical side alone, and so, in point of fact, is it argued, by Darwin for example, in favour of Volition. And if the evolutionist, after assuming this priority, were to go a step backward, as he is bound to do, in order to fill up a gap in the grand sequence of cosmical cause and effect, he must proceed upon physical connexion exclusively. The hypothesis now adduced is one among others in this direction.

Next, as regards the Emotions, taken in themselves, the tracing of physical concomitance is unavoidable, and is seldom evaded. Indeed, when bringing forward the more

fundamental and elementary emotions—Fear, Love, Anger—the physical signs are too manifest to be overlooked; it is only when emotion is highly idealised and compounded that we discard such references, and treat the case by subjective methods alone. This, however, is too absolutely stated, if we take account of the handling of emotion in Art. And even in the strictest scientific analysis, the physical expression, so manifest in the primary modes, although refined and attenuated, is still discernible and suggestive in their combinations. The laws that regulate the rise, concurrence, conflict, and subsidence of emotion can be traced subjectively; while their physical embodiment, being also known, passes through phases of physiological cause and effect, which serve to confirm and correct the introspective inductions. Whether avowed or not, inquirers do not scruple to go through the double sequence, so as to make the two sides mutually illustrative.

The recent researches in Psychophysics call for some remark, though they may be said to speak almost for themselves. The experiments are made upon the physical side, but not to the exclusion of subjective reference; in fact, they are experiments of concurrence or concomitance in order to ascertain general laws of concomitance, and to derive whatever benefit may be obtainable from the attainment of such laws. We cannot refuse to these researches the merit of satisfying an enlightened curiosity, if nothing further; which, indeed, is the sole justification of a very large amount of our most highly patronised researches. But if such researches were to attain anything like precision in their object of determining laws of concomitance, they could hardly fail to assist us in clearing up subjective sequences; at any rate, they would help to steady and confirm, and most decisively to express, the sequences indicated by pure introspection. As now conducted, these researches are more and more pressed into the service of every one of these ends, and admit of being criticised accordingly. No psychologist would discuss the Senses without taking notice of Weber's experiments on Touch—a line of investigation since exemplified in every one of the senses.

It is a well known fact that any form of muscular activity that we happen to be engaged in is arrested by a sudden mental diversion. We cannot easily carry on mental work and bodily work at the same instant. This is formulated on its physical side by Dr. Ferrier in these terms:—"The internal diffusion of nerve-energy involved in thought, and

the external diffusion of it in muscular action, vary in an inverse ratio". The grounds of the principle are physiological; the results have to be stated psychologically, seeing that they regulate the course of our inmost thoughts.

The "rhythm of Attention," or the intermittent character of mental exertion, is a very great fact of the system, and its precise elaboration and definition can be best approached from the physical side, as in the psychophysical laboratory. The position is emphasised by Herbert Spencer that "nerve is not capable of continuous stimulation or continuous discharge". Otherwise put, "the so-called nerve-current consists of successive pulses". The alternate remission and recuperation of our active energies, as embodied in muscle and nerve, is a physical law with psychical consequences in every region of our mental being. Whoever would see a full development of this law, as well as a fruitful rendering of the thoroughgoing concomitance of Feeling and Nerve-change should peruse Mr. Spencer's *Psychology*, more especially pt. i. Indeed the whole work is a sustained testimony to the propriety, if not the absolute necessity, of carrying physical concomitance into every portion of our mental nature.

There is one great law connecting Sense with Intellect, which has everything in its favour, and, so far as I know, nothing against it. If we reckon it still as but a hypothesis, it is one of very great probability. It relates to the *seat of ideas* obtained in the first instance through the senses, and declares the nervous tracts to be the same in both. There may be slight qualifications to the principle, but nothing to affect its substantial correctness. If there were no other law of nervous concomitance with intellectual function, this alone would redeem the search for *neural* accompaniments from superfluity or futility. The psychical bearings of the principle are most important, it being as yet the only key to facts of hypnotism. I need only refer to the adoption of it in that view by Edmund Gurney. Of course, neither this nor any other such law should be overstrained, or regarded as absolute. For one thing, a difficulty may be started to the effect that we may be thinking of one image and looking at another, thus causing a conflict of internal nerve-currents. The difficulty will no doubt have to be met, and, in meeting it, the principle will be either confirmed or modified; indeed, some progress has already been made in this direction.

Another great physiological truth affecting our mental operations universally, and likely to supply the explanation

just desiderated, is the need of a *motor response* to sensation in order to full consciousness of the state. This condition seems to grow out of the very structure of the nervous system, and has all the universality that we should expect in consequence. In a recent article in *MIND* (xii. 490), Dr. Maudsley illustrates this position with a fulness and a pointedness that dispenses with repetition in this place. To ignore the physiological truth is wilfully to blind ourselves to psychical helps. I have already had to advert to this condition in a previous page. It is dwelt upon with special emphasis by Dr. H. Münsterberg, as a guiding principle of his researches; my only doubt is whether he is not overstraining it. It is, however, enough here to quote it as a telling example of a really luminous physiological concurrence not to be neglected by any psychologist.

To come back again to the transition from Sense to Intellect: it has been always impossible to avoid describing ideas as modified repetitions of sensation, and employing for that purpose the materialism of the sense-organs. The language of thought—image, picture, idea, trace—is a proof of this origin. Whether accurate or inaccurate, expression demands such references. What is more: in order to state to ourselves the existence of sensible impressions and other results of thought when out of consciousness, we need a bold resort to material processes. When occupied with some present sensation, we are aware—and nobody has ever denied or thought it proper to ignore the concurring nervous processes, so far as inferrible—that nervous currents are proceeding from the sense-organ inwards to the nerve-centres, and ultimately reaching the brain-cortex, with responses in the shape of muscular stimuli. Let now the attention be transferred, let an entirely new and distinct sensation occupy the consciousness, and what becomes of the nervous agitation of the previous moment? It might be like the waves of a pool disturbed by a stone, persisting for a time and then ceasing for good. This, however, cannot be the case. For a sensation that has once occupied us for a time, while by a change of attention it is made to vanish, is found capable of recurring as an idea once and again in the same hour, or the same day, or even fifty years afterwards. Now, it is forced upon us, as a query if nothing more, Where are those sensations when out of consciousness? We want at least a language-aiding hypothesis to enable us to conceive what gives no sign of existence. The usual resort has been a very gross and imperfect metaphor—the ‘store-house’ or ‘receptacle’ of memory—material enough in all conscience, but very

defective as a psychological statement. Well, without pretending that we can verify any one view of the arrangements and processes of the nervous system that are the physical support of memory, we cannot help craving for some hypothesis, as far as the lights of physiology will carry us. We do not find that such hypothesis leads to any perversion of the psychical facts; while it need not be rated beyond what it is really worth, *viz.*, a help to expression. Its value does not necessarily stop there; we may be led by it to canvass facts of mind on the one hand and of body on the other, so as to confirm or confute it, and ultimately replace it by something better.

The physical conditions of Consciousness in general have been much studied of late, and the results have been on the whole decisive and valuable. They have been recapitulated with additional illustrations in Dr. Maudsley's article just alluded to. There would be no assignable gain to psychology by blotting out all these speculative inquiries, based as they are upon accessible and well-ascertained facts. Importance is justly attached to the limitation of the conscious area, and the reasons of that limitation can be stated physiologically with even more precision than psychologically. In the latter view, all we can say is, that we attend only to one thing at a time, which is not true except under qualifications; and, in stating these, physiology is our greatest help. The more general conditions of conscious wakefulness, as opposed to the unconscious modes of languor, sleep, swoon, as already remarked, are pre-eminently related to the science of mind proper. The decline and cessation of consciousness in certain operations that are properly mental, as in the consummation of habit or routine, is an important item in psychological theory.

If we advert more particularly to the *abuse* of the physical side, we can easily see what it must consist in, now that we have surveyed the various examples of the use. It is, of course, abused when it is unnecessary, and, still more, when it is mischievous. But the point is, what are the circumstances that render it mischievous as well as unnecessary? While eminently applicable to all the phenomena of mind at their elementary stage—Sensation, Intellect, Emotion, Will—it ceases to have the like bearing in the higher complications; that is to say, it cannot be assigned with precision, or even with suggestive hypothesis. Taking, for example, the Emotion of Fear in its most elementary form, the physical accompaniments are both assignable and sug-

gestive. The same might be said of the Tender Emotion, and of Resentment or Malevolence, but in a compound of these with one another and with a mass of intellectual association, it would be a mistake to trace physical workings beyond the inevitable consequences in outward expression and in voluntary action. The analysis of the Sublime, for example, is rightly conducted on exclusively subjective lines. In the discussion of Consciousness at large, no one would appeal to purely physical accompaniments. All this leaves to the introspective inquirer by far the largest portion of our mental constitution. Thus the question as to physiological conditions is still a comparatively small part of a well-developed system of psychology.

As regards Intellect proper, we have seen the importance of indentifying the nervous tracts of ideas with the tracts of the corresponding sensations. But, now, if we recur to the test-example of physiological aid in clearing up mental processes, *viz.*, the Association of Ideas, our final decision upon it must be to the following effect. In all that part of Association that states the order of recurrence of our ideas in Memory, subjective investigation is paramount and exclusive. Moreover, it is eminently efficient for the purpose in view. The important circumstance in our intellectual trains is the fact that they repeat the objective world, where our mental grasp is at its utmost, and disclose the laws of their order with facility and precision. The first really acute thinker that rose to a statement of the question—Are there laws of sequence in our ideas?—could scarcely fail to discern these laws nearly as we now have them. Introspection is alone equal to this task; physiology has no part in it now, and in all probability never will. The highest conceivable advances in our knowledge of nervous processes and arrangements could only give a very imperfect rendering of either Contiguous Association or the Attraction of Similars. So much for one aspect of the problem.

There is, however, that other aspect whereon I have already dwelt. While the laws of order of recurrence of thought are fundamentally unalterable, they are qualified by a condition, or set of conditions, which are stateable not merely as psychical facts but as physically conditioned; and if so, physical conditions play a concurring part not to be ignored. The state described by a variety of names—Conscious Intensity, Excitement, Mental Concentration, Attention, Interest—is expressible both subjectively and physiologically. Even with our present knowledge the physiology of the state is important and suggestive, and future researches may add

to its precision and its helpfulness as a guide in practice; while our subjective study has probably even now reached its culminating point. This, then, is the answer to the challenge as embodied in the instance of Association.

It is manifestly an abuse to give a physical link as the substitute for a psychical or mental. The mistake is not often made in reality. When an orator in the House of Commons objects to the union of two principal State-offices, as too much for one brain, he is not necessarily a materialist; he merely uses the acknowledged dependence of mind on brain as a figure of metonymy to make the statement more impressive. Once grant that every one of our mental processes has its physical concomitant, and there is no need, and no temptation, to make the physical take the place of the mental except in the figurative way.

Whether a professed psychologist—teacher or writer—gives up too much of his exposition and investigation to purely physical incidents, is a matter solely of the proprieties of his position. Every expositor is apt to give an undue preference to one part of his subject; while some teachers pay too much attention to the physical, others pay too little. The most ambiguous position of any is the statement of those instances where there is a manifest assignable concurrence of physical and mental without any obvious mutual lights or reciprocal gain. It may be said that a physiologist should not trouble himself with psychical accompaniments that suggest nothing physiologically and *vice versâ*. Such cases, and no doubt there are such, may be said to fall between two stools, and deserve to be neglected or discarded. What remains to be said for them is simply the gratification of intellectual curiosity, together with a contribution to the establishment of the universal law or bond that unites the mental and the physical. One instance in point—the Reflex Operations—has already been adverted to. We may, however, adduce the far more striking example furnished by the researches of Ferrier and others on Cerebral Localisation. A considerable amount of scientific interest has been aroused by these laborious inquiries; but they have added nothing to the explanation of our intellectual workings, while in Physiology the interest is purely theoretical. Possibly, they may be the beginning of great results on both sides; but if we were to insist on the ideal of the subjective purists we should make no mention of them in Psychology proper.

One extremely important aspect of the union of Mind and Body is presented by the circumstance that has received prominence only in later times, that we are constantly applying spiritual remedies to bodily ailments, being often unaware of what we are doing. This ignorance is not so frequent now as it was in former times; we are becoming gradually more disposed to employ physical treatment for purely physical maladies. It is the fact that depression due to physical causes may be more or less removed by applications of an intellectual or moral kind; as when a sufferer from illness is cheered by the sympathy of friends. On the other hand, a blow of a purely mental nature can be sometimes effectually met by a physical tonic. The interaction of the two sides of our being in those instances has very great significance. There should, however, be no mistake about it. We should understand that the first and most direct and efficient remedy for physical derangement is physical treatment; and so with the mental: "Rachel, weeping for her children, and would not be comforted, because they are not". When we fail to remedy each mode by its own kind, we may properly make trial of the other kind, and may have a partial success. What we need is to appreciate exactly the case that we have to deal with, and to ply the most suitable weapons at our disposal. Past history records a long series of mistaken renderings of human misery with a corresponding misjudgment in the choice of remedies.

II.—APPERCEPTION AND THE MOVEMENT OF ATTENTION.

By G. F. STOUT.

I PROPOSE by the present article to prepare the way for another, which is to treat of the function of Language regarded as an instrument of Thinking. To this end, I shall examine in general the process of thinking, so far as to enable me to indicate in broad outline the mode and degree in which this process is affected by the use of language. The result thus reached will then serve as a starting-point for my second article.

Thinking is action directed towards intellectual ends. Intellectual ends are attained by an appropriate combination of movements of attention just as practical ends are attained by an appropriate combination of movements of the body. If, therefore, we desire to explain the process of thinking, we must clearly determine the nature of active Attention. This is not, however, a complete statement of the problem before us. The analogy between practical and theoretical activity holds good also in another important respect. The efficacy of our actions as directed to practical ends depends on the nature and connexions of the material things on which we act as constituent parts of a physical system. Similarly, the efficacy of the movement of attention as directed to theoretical ends depends on the nature and connexions of the presentations attended to as constituent parts of the mental system—the *totum objectivum*. This part of the subject is covered by the theory of Apperception, as the word is applied by followers of Herbart, and more especially by Prof. Steinthal. Attention and apperception reciprocally determine each other. It is through apperception that a presentation acquires the significance and interest which enables it to attract attention. On the other hand, the heightened intensity which accrues to it as the object of attention enables it to react with increased energy upon the components of the mental system to which it belongs. In tracing the development of intellection, it will be found necessary to bear in mind continually both the essential distinctness and the thorough-going interdependence of these two processes.¹

¹ What I here call Attention, is called by Wundt Apperception. I prefer the Herbartian application of the term, Apperception, because I know of no other word which can be conveniently used to express the same meaning.

§ 1. *The Movement of Attention.* The movement of attention is the process through which particular presentations are successively singled out from the total system of elements constituting the individual mind to receive special salience as contents of consciousness and special efficiency as factors determining the course of mental events. The exact nature of this process is far from being fully ascertained. But modern psychological and psychophysical researches seem to have placed one very important point beyond reasonable doubt: Bain, Ward, Ferrier, Münsterberg, N. Lange and Ribot, although they are in other respects more or less at variance, concur in regarding attention as a motor process. Considerable progress has also been made in determining the special nature of the motor elements involved. Modifications of breathing play an important part in the effort to attend, as well as in all other motor exertions. This is admirably brought out by Münsterberg's experiments on the 'Time-Sense' (see MIND No. 60). Concentration of attention also involves vaso-motor action, determining the direction of the blood-supply to special parts of the brain or sensory surface.

It is, however, most important to lay stress on the part played by muscular movements and tendencies to muscular movement. Specific tendencies to innervate certain groups of muscles form integral constituents of every presentation considered as a factor in the psychological mechanism¹. All distinct sense-perception involves muscular adaptation of the organs of sense. Münsterberg in the course of his experiments on the subjective measurement of time, had occasion to make a careful and accurate examination of these adjustments, and I here quote the graphic account which he gives of his experiences (*Beiträge zur exp. Psychologie*, ii.) :—

"When visual impressions are received by me at certain irregular intervals,—when, for instance, at intervals of from one to three seconds a bright object appears against a dark background and again disappears,—I feel on each repetition of the stimulus a tension in the muscles of the ocular cavity, as they turn my eyes steadily towards the illumination; I feel how all the muscles of the eye contract to keep the gaze sharply fixed; I feel how the muscle of accommodation is strained to produce distinct vision; in short, I am conscious, as soon as the stimulus begins to act, of a condition of heightened tension in the organ of sight, by which the visual impression gains in clearness and becomes predominant over other contents of consciousness at the moment. Further, when the stimulus is powerful, I feel that the muscular tension which it thus occasions, affects not only the eye, but also the muscles of the head and neck,

¹ I do not say that they form integral constituents of every presentation considered as a content of consciousness, because I do not wish to take a side in the controversy concerning the sense of effort.

so as to keep the head exactly fixed in a favourable position for receiving the impression. Sometimes I am aware that the motor innervation extends even to the muscles of the arms and shoulders, as if I wished to hold the stimulus fast; and the muscles of the chest are also brought into play as if I wished to hold my breath in order to apprehend the impression with all possible distinctness."

These muscular adaptations form a most important part of the process by which we attend to percepts. They constitute a complex motor activity giving predominant clearness and dominance to a presentation, and attention is just such an activity.

It is important to notice that no sharp line of demarcation can be drawn between muscular action which serves to produce clear apprehension of a percept and that which produces physical change in external things. The two to a large extent coincide. It is true that we do not change a thing merely by fixing our gaze upon it. But the case is different when we lift a body in our hand. We then by the same act alter the position of the body and enable ourselves to appreciate its weight more distinctly. It may in fact be laid down as a general rule that all muscular action, in so far as it is not automatic, tends to give distinctness and dominance to the sensations by which it is guided.

The process of attending to ideas ordinarily involves at least a partial and modified reproduction of the same motor activities which constitute attention to the corresponding percepts. I call such reproduction partial and modified, because, as Prof. Bain points out, it for the most part falls short of actual movement. This is however by no means always so. It is quite possible to fix attention on an idea by means of actual movement. Thus we may obtain a clear image of a geometrical figure by tracing it in the air with the tip of the finger. The same result may be produced by a corresponding movement of the eyes. Similarly, we may by movements of the organs of speech strengthen the mental representation of an articulate sound without actually uttering it. So, too, we can by greater or less convergence of the eyes help ourselves to picture an imagined object as situated at a greater or less distance from our bodies.

Even when attention to ideas is not accompanied by actual movements, it often involves a noticeable tension of the muscles, similar to that which arises when we make an effort to move and at the same time by a counter effort arrest the intended movement in its first inception. Thus, when we concentrate attention strongly on a visual image, we feel a muscular strain localised in the ocular cavity.

Muscular sensations of this kind are very much intensified by an attempt to accelerate the speed with which attention passes from one object to another. If I endeavour to repeat mentally a verbal formula, hurrying through it with the greatest possible rapidity, the strain in the organs of articulation becomes painfully intense. The same thing happens, *mutatis mutandis*, if I endeavour to bring before my mind's eye in very rapid succession the parts of a remembered scene.

Attention to ideas is not always accompanied either by actual movement or by any very appreciable muscular strain. But there are cogent reasons for believing that, even when these are absent, the action of attending to a representation is constituted by a modified revival of the same motor impulses which enter into the corresponding perceptual experiences.¹ The idea of a movement is the movement in its commencement, and all ideas are to some extent ideas of movement. All sense-perception involves, as we have seen, muscular adaptations of some kind, and all mental imagery is ultimately derived from sense-perception. Hence every presentation includes as part of its own being a tendency to innervate certain groups of muscles in a specific manner. These motor dispositions play a two-fold part in the process of concentrating attention. On the one hand, they give distinctness and vividness to the sensory constituents of the mental complex to which they belong; on the other hand, by arresting incompatible motor processes they exclude from clear consciousness the sensory elements with which these processes are connected. The second of these effects is referable to the general law according to which a group of motor innervations tends to inhibit all other groups which are not automatic. It is more difficult to obtain a clear view of the way in which a representation derives distinctness and intensity from the motor impulse with which it is connected. N. Lange seems to think that all depends on the faint excitation of the muscles concerned giving rise to muscular sensations, which reinforce the corresponding elements of the ideal complex and so indirectly intensify the complex as a whole. Dr. Ferrier holds that the motor impulse takes the form of attention to ideas because it is hindered from producing actual movement. According to him the outgoing wave of nervous excitation,

¹ Cp. N. Lange, "Beit. zur Theorie der sinnl. Aufmerksamkeit, &c.," in *Phil. Studien*, iv. 390; Münsterberg, *Beiträge*, i. 137; Ribot's *Psychologie de l'Attention*; and the writings of Bain and Ferrier *passim*.

being arrested in its course, becomes diffused within the brain itself. Dr. Bain also seems to incline to this view. Probably the causes indicated by Ferrier and Lange respectively are both operative. However this may be, it seems clear that the positive effect of the movement of attention is to a large extent the necessary correlative of its negative effect. The relative distinctness and dominance of the idea attended to is due in great part to the suppression of competing presentations by arrest of the motor processes with which they are connected.

§ 2. *Attention, not an occasional phenomenon.* Attention is not an occasional act. In the ordinary course of waking life we are constantly engaged in attending to some presentation or other or in transferring attention from one presentation to another. I think it needful to insist on this point because Prof. Ribot seems to take a different view. He defines attention as a state of *monoideism*; by this he means that all the mental forces converge upon the idea attended to, which thus becomes the focus of the total mental activity at the moment. This account of attention is in full agreement with that which I have given above. But when Prof. Ribot proceeds to assert¹ that the state of *monoideism* is an occasional and exceptional phenomenon, he seems to be confusing a mere difference in degree with a difference in kind. Under ordinary conditions, a more or less complete *monoideism* is a constant character of our mental life. From moment to moment special presentations are singled out to receive unique salience as contents of consciousness, and unique efficiency, as factors operative in mental process. These presentations may not fully pre-occupy the field of consciousness. There is often an outer zone, as Mr. Sully calls it, of comparatively vague and feeble imagery. When concentration of attention is most strenuous and sustained, *monoideism* is most complete. The outer zone may then nearly or altogether disappear. But the difference in clearness and strength between the objects of attention at its highest pitch of concentration and those which become successively salient and dominant when we make no exceptional effort to attend is a difference of degree bridged over by all manner of intermediate gradations. In order to account for it, we do not need to assume the operation of a special kind of activity in the one case which is absent in the other. On the other hand, the difference

¹ *Psychology of Attention* (Eng. trans.), p. 118.

between an object of clear consciousness at any moment and the other constituents of the mind at the same moment is, so to speak, an unbridged chasm. In order to account for it we must assume that the unique salience and dominance of the presentations which successively occupy the focus of consciousness is due to a specific process. This process must be called attention, if the language of psychology is to mark scientific and essential instead of comparatively trivial and popular distinctions.

§ 3. *Mental Systems*. "Undoubtedly the ultimate element of the social organism is the individual man—but between the individual and the whole, there are various smaller organisations, various systems of a less complex composition, which severally play their distinctive parts in the life of the whole. These minor groups are, in the strict sense, elements of society, each having its specific tendencies, opinions, desires, passions, which combine or conflict and so give to the whole in which they are united an aspect of unity or of incoherence, according to the nature of their mutual relations. In psychology we find secondary combinations of an analogous kind—syntheses of simpler elements, entering in their turn into the composition of higher syntheses, and into the general life of the mind."¹ The same man belongs at once to his political party, to his church, to his family, to his club, to his trade or profession and so forth. He is thus connected with a multiplicity of separate social groups, each having its own distinctive aim and function and its own appropriate mode of organisation. To each of these distinct social relations there corresponds in his own mind a distinct group of psychical elements. These are subordinate components of his general mental organisation just as the various minor social systems are subordinate components of the general organisation of society. Similar mental groups tend to grow up in connexion with each of the special aspects of his experience. To understand the meaning of a word, to identify, or classify a perceived object, to plan a consistent course of action—are all mental processes which involve the existence of groups of ideas, having severally a certain systematic unity.

The analogy between mental and social organisation may be carried further. In so far as a man actually participates in the special activity of any one of the social systems to

¹ *L'Activité Mentale*, par M. Paulhan (see MIND xiv. 579). Most of the illustrations given in this § are borrowed from the same source.

which he belongs, he is for the time being debarred from taking part in the special activity of the other co-ordinate systems, as well as from asserting his own independence. Brutus in his office of magistrate ceases to be a father. In like manner, mental elements which share in the activity of one mental system are for the time disabled from acting either in any other systematic combination or independently. When we are engrossed in writing or speaking about some serious topic, it does not occur to us to make puns in the words we use. When we are interested in a game of billiards, the idea of the billiard balls, does not set us thinking about the trade in ivory and African slavery.

On the dissolution of a mental system, whether brought about by pathological conditions or otherwise, its several components begin in their isolation to display the tendencies, which their combination had suppressed. Mental anarchy in this respect resembles social anarchy. When a social organisation is broken up, its component groups or its component individuals do severally what is right in their own eyes. So too, when a mental organisation is dissolved, its elements become free to act independently. Aphasic patients for whom language has ceased to be an instrument of thought, sometimes show a strong tendency to string words together in a connexion determined merely by alliteration, assonance, &c. In certain phases of the hypnotic trance and in some other pathological states, mental systems act in abnormal isolation from each other, giving rise to beliefs and conduct which would be impossible to the subject in his normal condition. Similar results may be brought about in manifold ways. The inverse happens when a number of groups which have previously existed in relative detachment from each other become combined in systematic unity. The action of each becomes limited by their union, as the liberty of individuals is restricted by their combination in an organised society. Thus Darwin's passion for miscellaneous collecting became restricted in its range when it was subordinated to a great scientific purpose.

§ 4. *Apperception.* Under the term Apperception are included all such processes as understanding, interpreting, identifying, subsuming, &c. These processes have one feature in common. A presentation, which is understood, interpreted, identified or classified, is thereby set in a certain relation to the mental preformation, as this has been organised in the course of previous experience. It enters into

systematic connexion with other constituents of the mind. Apperception may therefore be defined as *the process by which a mental system incorporates or tends to incorporate a new element*. It is necessary to introduce the words "or tends to incorporate," in order to cover the cases in which an unsuccessful attempt is made to identify, classify, interpret, &c. In almost every moment of waking life an apperceptive process is taking place. Every presentation which is attended to is also apperceived. There is in the mind some appreciation of its special significance in a practical or theoretical point of view. The effect of attention is to a great extent dependent on the apperception, which accompanies it. Those aspects of the presentation attended to, which are congruent with the apperipient system, acquire special distinctness. Others pass unnoticed. The physician will at a glance detect in a patient symptoms which have escaped the anxious scrutiny of friends and relatives. The reason for this does not lie in his superior power of concentrating attention. He is able to note what they fail to note, because in his mind an apperceptive system has been organised, which they do not possess.

As vital process comprehends in a higher synthesis physical and chemical changes, so the systematic activity which we call apperception comprehends in a higher synthesis the elementary processes of Association, Fusion, Conflict, &c. Apperceptive activity is constituted by a systematic combination of these elementary processes. No psychology can be adequate which takes account of the processes, without taking into account their systematic co-ordination. To explain the concrete working of the mental organism merely by reference to the laws of Contiguity and Similarity is like explaining the action of a complex machine merely by reference to the abstract formulas of Mechanics, or like explaining the way in which a house is built by merely stating the mode in which one brick is cemented to another. English Associationism has to some extent erred in this direction. It is therefore important to bring into prominence such doctrines as the Herbartian theory of Apperception and M. Paulhan's substantially identical theory of Systematic Association.

§ 5. *Attention as aiding Apperception.* Attention is a process auxiliary to apperception. The act of attending may be compared to the act of prehension by which an animal seizes and retains its prey until it has consumed it. The movement of attention fastening upon the presentation to

be apperceived,¹ fixes it in the focus of consciousness, until the apperceptive system has finally succeeded or failed in assimilating it.

The part played by this auxiliary motor process is best shown by a comparison of the cases of apperception in which it is absent with those in which it is present. As a rule, it is brought into play only when the incorporation of a new group of mental elements by a preorganised system is to a certain degree, resisted and retarded. Attention then helps to overcome the obstruction. By intensifying the apperceived presentation it intensifies and prolongs the apperceptive process. On the other hand, when through habitual exercise an organised system of psychical elements has become so preconformed to a special class of familiar experiences, that it assimilates them with a certain degree of ease and rapidity, apperception may dispense with aid from attention. Attention is less useful in proportion as the preadjustment of the mental organisation is more nearly perfect. In some cases its intervention would be a positive hindrance instead of a help, because the act of attending would occupy more time than the apperceptive process occupies by itself. In some instances attention is not only useless, but impossible. The apperceptive process is finished before the act of attending can begin.

The formation of a perceptual complex by the apperception of sense-impressions always takes place sub-consciously, except in the early stages of mental development in which we are still learning to apprehend sensible things by means of sight, touch and hearing. In the relatively developed mind the whole process takes place with so unflinching a celerity and facility that there is no occasion and no opportunity for the interposition of attention. The final product of this process may become focused in consciousness by entering into relation with a more comprehensive mental system, which strives to incorporate it, but which can only do so, with comparative slowness and hesitancy. But the apperception by which the percept is formed is in all its stages independent of the movement of attention and does not under ordinary conditions admit of its intervention. All secondarily automatic actions, which involve in any degree free adaptation to varying conditions, depend on apperception dissociated from attention. These apperceptive processes differ for the most part from those which result in the

¹ This it may do, as we shall see in the sequel, either directly or indirectly through the mediation of a word or other analogous sign.

formation of a percept, inasmuch as they do not exclude the possible interposition of attention. They even require and, *ceteris paribus*, induce it, so soon as the actions which they control and guide, become complicated beyond a certain point, or involve adjustment to unusual circumstances. Such actions then cease to be automatic and unconnected with the main stream of conscious life. We may under ordinary conditions thread our way through a throng of people, while our attention is preoccupied by a train of abstract thought. The guidance of our movements depends on the successive apperception of a series of presentations which escape our notice. If however, an unusual obstacle confronts us, it is likely to strike our attention—even before we come into physical collision with it. We may perform co-ordinated movements of this kind either automatically or with full consciousness, according to the nature of the apperceptive groups which combine to determine and control their execution. Thus I may throw stones at a mark without any assignable motive, except that the stones are easily within reach and the mark conspicuous. In this case I shall probably not attend to what I am doing, except in a faint and intermittent way. I may even be at the moment talking or thinking about an altogether disconnected topic. If, however, someone has made a bet with me that I shall miss, the case is altered. The apperceptive system which constitutes my estimate of my own powers and my estimate of the opinion of others concerning my powers, is then brought into play. If I represent myself as about to succeed, this apperceptive system tends to become modified in a particular way. But the ideas which correspond to the alternate possibility of my failure, even though they remain sub-conscious, obstruct the apperceptive process. Hence I attend carefully to what I am doing. I note the weight and form of the missile, the size and distance of the mark, the direction of the wind, &c. It would be easy to multiply similar instances exhibiting the general nature of the conditions, under which apperception is accompanied and assisted by attention. It will here be sufficient to adduce one more illustration, which by reason of its simplicity may be conveniently regarded as typical. We do not, as a rule, expressly attend to the personal appearance of familiar acquaintances, although we show by our words and actions that we recognise them when we meet. If however, any unwonted change has taken place in them, we are very likely to notice it. If, contrary to their previous custom, they

have begun to wear glasses, if they are paler than usual, or if their voice is altered, we are struck by the novel circumstance, and in consequence attend to it. This means that the novelty, being in conflict with our preformed ideas, obstructs apperception, and so occasions a motor activity by which the apperceived presentation is invested with pre-dominant intensity and distinctness.

The more important and extensive is the modification which a preorganised system undergoes in the act of incorporating a new element, the more likely is this new element to attract attention. Now, *ceteris paribus*, the more complex and comprehensive is the system, the more liable it is to undergo frequent and important modifications. A small group of psychical elements moulded by, and adapted to a narrow circle of experiences, may easily become fully organised, so as to require no further readjustments, except such as have been rendered by custom in a high degree facile and rapid. On the other hand, a very complex and extensive group adapted to very complex and variable experiences, can never become so perfectly organised. Owing to the multiplicity of its constituents and the intricacy of their interconnexion, it can hardly fail to offer resistance at some point or other to the assimilation of new elements. It follows that a presentation is, *ceteris paribus*, more likely to command attention in proportion as the system by which it is apperceived is more comprehensive and complex.

We have now considered the general conditions which determine, whether, when an apperceptive process is taking place, it shall or shall not be accompanied by attention to the apperceived presentation. We have not as yet discussed the conditions which determine whether an apperceptive process shall or shall not take place. This depends, as we shall see in the following §§, on the co-operation and competition of different apperceptive systems.

§ 6. *Co-operation and Competition of Apperceptive Systems.*

In so far as the mind is a unity, it tends to become affected as a whole by changes taking place in any of its component elements. For this reason an apperipient system tends to excite other systems in a degree varying directly with the intimacy of its connexion with them. The apperceptive activity of one group communicates to others a wave of excitation by which they are prepared to become in their turn apperipient. They are by this means rendered alert and ready to act so soon as occasion arises. This process by which an ideal group in the exercise of its apperceptive

function prompts others to a similar activity, is what I call the *co-operation* of mental systems.

On the other hand, every ideal group in the exercise of its apperceptive function tends to debar all other groups from becoming apperipient, excepting such as are at the moment capable of combining with it in the same systematic activity. This follows, in part, from the very nature of an apperceptive system. Elements which are united in the same apperceptive process, are *ipso facto* disabled, for the time being, from taking part in any other. Otherwise the word *system* would have no meaning. An ideal group cannot, therefore, become apperipient, if some of its essential constituents enter also into the composition of a different group which is in full action at the time. Another ground of competition between ideal systems is to be found in the quantitative limitation of the total mental activity in each moment. In proportion as mental energy is engrossed by one group, other groups are enfeebled. If in the course of our thoughts we come upon some topic of extraordinary interest, we often suspend even the automatic movements which depend on apperceptions disconnected with the main stream of mental process, we cease walking or let our cigar go out.

The nature of co-operation and of competition may be illustrated by the interaction of co-ordinate groups, which are subordinated in an analogous manner to a single comprehensive system. A system so organised may apperceive in a twofold way according to the nature of the apperceived presentation. It may assimilate the new element in a general manner without incorporating it in any one of the subordinate groups. On the other hand, the new element may by the same act be incorporated in the total system and in one of the sub-groups. I may see that an object, at a distance, is a bird, without being able to discern what kind of bird it is. In this case the object is apperceived by the class-group, represented by the term, bird. But it is not apperceived by any of the minor groups, represented by the terms—thrush, blackbird, &c., except in so far as these necessarily take part in the systematic activity of the whole to which they belong. When the object approaches nearer, I may be able to discern not only that it is a bird, but that it is a thrush. This means that it is apperceived by one of the co-ordinate sub-groups to the exclusion of the others. It is incorporated not only by the total apperipient system, but by a specialised portion of that system. The co-ordinate sub-groups compete with each other because they can exercise their distinctive functions only in exclusive alternation. They co-operate with each

other because they are all integral parts of one system. Each of them in so far as it shares in the general excitation of the whole in which it is contained, become prepared to play its own proper part so soon as occasion arises. Thus, when I see the bird in the distance, the various sub-groups, corresponding to different species of birds, become excited and the excitation of each sustains and heightens that of the rest. Each is on the alert to exercise its special apperceptive function, to the exclusion of the others.

A peculiarly instructive illustration of the co-operation and competition of co-ordinate sub-groups is to be found in certain experiments of Münsterberg on reaction-time, of which a general account was given in MIND No. 58. The subject of these experiments knows beforehand that he will hear in irregular order names of persons or things belonging to one or other of five classes,—*e. g.*, poets, musicians, men of science, philosophers, and statesmen. He is however entirely ignorant what particular names will be from time to time selected. The special groups corresponding in his mind to Byron, Kant, or Kepler, become apperceptive at the time when the name strikes his ear and not before. But these groups are already in a state of incipient excitation in as much as they have been to some extent involved in the general activity of the class-system to which they belong. Hence they are prompt to apperceive¹ when their turn comes. The importance of this preparatory process is shown by the result of the experiments. The subject reacts by lifting one of his five fingers and he lifts a different one according to the class to which the person named belongs. One finger is raised for a poet, another for a musician, and so forth. Now Münsterberg shows that the preliminary processes intervening between the reception of the impression and the appropriate reaction which they determine may take place sub-consciously and that when they do so they occupy a very much shorter time. When conscious identification precedes the raising of the finger the whole duration of the reaction-time may be more than doubled. This must imply that the incipient excitation of the groups through which identification takes place, renders them so prompt to apperceive and so energetic in their action that they need no support from attention, but are on the contrary merely delayed and impeded by it. Similar examples of the co-operation of mental systems are con-

¹ We apperceive a word when we connect it with its appropriate meaning; although as I shall have to point out later on, these apperceptions are of an exceptional kind.

stantly occurring in ordinary experience. A person of a religious turn of mind is prepared for devotional exercises merely by entering a church. Another with a superstitious bias is predisposed to see ghosts by the mere presence of darkness and solitude. If I meet with a Latin word in reading a Latin book, I am not misled by its accidental likeness to an English word, as I might be, if I came upon it casually and unexpectedly. In a printing establishment the term "proofs" is likely to receive a different interpretation to that which would be attached to it in a polemical discussion. In such cases the apperceptive activity of a comprehensive system maintains each of its component sub-groups in a state of readiness to apperceive presentations with which they have special affinity. Co-operation is strongest and most effective between groups, which are thus interconnected according to an articulate plan as co-ordinate parts of a highly organised whole. But it also takes place between all groups which enter into the composition of the empirical self, in a greater or less degree, according to the greater or less intimacy of their interconnexion.

Competition is a trial of strength between competing systems. Co-operation is one of the main conditions on which their comparative strength depends. In so far as an apperceptive system transmits a wave of excitation to other systems it strengthens them even against itself. It follows that, *ceteris paribus*, the power of an ideal group to compete with others increases as the degree in which it co-operates with them diminishes. In cases like those presented by M.'s experiments, co-operation is the predominant condition determining the comparative strength of competing sub-groups, and it affects these sub-groups in an approximately equal degree. Hence the reason why one becomes apperceptive in preference to the others lies mainly in its greater affinity with the presentation to be apperceived. But co-operation is by no means the only circumstance on which the power of an apperceptive system depends. In the following § we shall have to consider a number of other conditions determining the comparative readiness, energy, and persistence with which different ideal groups exercise their apperceptive function. These conditions combined with the influence of co-operation determine, *ceteris paribus*, which of a number of competing groups shall succeed in becoming apperceptive. When a plurality of objects, each having exclusive affinity with a different system of ideas, are simultaneously presented to the senses or suggested by the train of association, that

presentation is apperceived, which is congruent with the most powerful system. Similarly when the same presentation is capable of being incorporated by different systems, the strongest of them apperceives it. If they apperceive it in turn they do so in the order of their relative strength. We have now to indicate the conditions on which this difference in the power of ideal systems depends.

§ 7. *Conditions determining the strength of Apperceptive Systems.* These may be either extrinsic or intrinsic. The intrinsic conditions are inherent in the constitution of the system itself. The extrinsic consist in passing circumstances which from time to time favour its activity. Among these latter are included :—(1) The co-operation of another system ; (2) The recency or (3) The intensity of its own previous action ; (4) The influence of organic sensation ; (5) Its own freshness arising from previous repose. The intrinsic conditions are :—(1) The comprehensiveness of the system ; (2) Its internal organisation ; (3) The strength of the cohesion between its parts ; (4) The nature of the sensory material which enters predominantly into its composition.

I have already treated of the influence of co-operation and I shall have more to say concerning it in § 8. Its effect is greatly modified by other conditions. Through it apperceptive groups are stimulated to become apperipient ; but they respond to the stimulus only in so far as they are excitable and their excitability depends on other causes.

An apperceptive system is, apart from fatigue, more prompt to apperceive the more recently it has been brought into play. *Ceteris paribus* the ideal group which is apperipient in one moment will also be apperipient in the next. Being already in action, it tends to continue in action. Competing groups find it in possession of the field and they have to dispossess it, before they can take its place. Further, the state of excitation into which a system is thrown by the exercise of its apperceptive function, tends to persist afterwards. It is only by a gradual process that the system sinks into its previous condition of comparative inertness. When we are absorbed in the consideration of some interesting topic, any circumstance which diverts our attention from it usually occasions only a transient interruption. So soon as the disturbance ceases, our thoughts pursue their former course, as if they had never been arrested in it.

The effect of intensity is ordinarily most conspicuous, when it is combined with that of recency. An apperceptive group which has been both recently and intensely excited is apt to assume for some time a tyrannical predominance over competitors otherwise more powerful than it is. We all know how difficult it is to dismiss from our minds permanently and completely a subject about which we have recently been very much excited. A game of chess which has roused a keen interest in us, is likely for some hours afterwards to recur to our thoughts, even in the midst of more important occupations. Certain pathological cases furnish very striking instances, in which the effect of intense excitement is greatly exaggerated and prolonged—sometimes permanently. "A lady frightened by robbers takes all men she sees for brigands who means to assassinate her; another having seen her child knocked down by a horse cannot be persuaded that it is living by any arguments or even by the sight of it, although it is quite well."¹

The influence of the coenæsthesia on the relative strength of apperceptive systems is of fundamental importance. The ideas connected with the satisfaction of an organic need commonly assume exclusive predominance so soon as the corresponding organic sensation is felt with a certain degree of intensity. The pangs of hunger will ordinarily cut short the most absorbing train of abstract speculation. The influence of varying modifications of the coenæsthesia is however, by no means confined to simple cases of this kind. It pervades our whole mental life. Every specific kind of emotion is accompanied by a characteristic mode of organic reaction. The resulting systemic sensations form a most important constituent of the emotion itself and they become intimately associated with the apperceptive system which is dominant when the emotion is felt. A recurrence of a similar organic state, from whatever cause it may arise, will tend to re-excite in mass the whole mental system with which it has thus become coherent. The most striking illustrations of this point are to be found in the psychological effects of sexual excitement. For an excellent discussion of this topic I refer the reader to M. Paulhan's book, pp. 458-476. The emotion of fear is accompanied and in part occasioned by certain disturbances of the heart's action, of respiration, &c. The occurrence of somewhat similar disturbances in sleep will give rise to terrifying dreams.

¹ *L'Activité Mentale*, p. 72; M. Paulhan gives many other illustrations.

In waking life they may give rise to anticipations of danger and disaster which would never have been entertained in a state of sound health. In like manner, a low condition of body may colour our whole view of our own circumstances, actions and prospects. It may cause us to regard our past life as a failure and our future as full of difficulty. On the other hand a vigorous state of health favours hopefulness and self-complacency. In early stages of mental evolution, the relative strength of apperceptive systems depends almost entirely on organic sensation. The first differentiation of the mind into distinct systems depends on the existence of distinct practical needs. As mental development advances, other conditions acquire increasing importance.

The comparative freshness of an apperceptive system often renders it more excitable than others which are in other respects more powerful or equally so. Prolonged activity occasions fatigue and necessitates a period of inaction, which affords an opportunity for fresh groups to become apperceptive. We all know by familiar experience how much we stand in need of recreative change. The more complete the change, the more effective it is. A system enjoys adequate repose only when it is displaced by others which do not subexcite it too strongly by co-operation. Otherwise it is like a man in troubled and unrefreshing sleep. It continues to be indirectly excited and therefore indirectly fatigued. The recurrent effect of fatigue is noticeable even in the course of what is ordinarily called a continuous train of thought. Transient intermissions of activity become from time to time necessary during which the mind momentarily wanders to other topics. Short intervals of comparative repose restore the excitability of the apperceptive system which then reassumes its predominance—a predominance due in part to the very intensity and recency of the activity which gives rise to fatigue.

We must now consider the way in which the strength of apperceptive groups is determined by their own internal constitution. The excitability of a system of psychical elements depends very largely upon the degree of its inward organisation. It is more easily stirred to activity, as a whole, the more rapidly and completely the excitation of any one of its components spreads to the rest. Now the rapidity of diffusion within the system varies according to the general plan of combination interconnecting its constituent parts. The more manifold are the relations by which each element is united with all the rest, the more completely, rapidly and certainly will the whole become implicated in the activity of the part.

This condition is best fulfilled by a symmetrical scheme of interconnexion such that co-ordinate sub-groups bear a similar relation to each other, and to the whole, and are themselves composed of minor groups combined according to an analogous plan. We may adduce as an instance of a system organised in this manner, the philosophy of Hegel as it exists in the mind of the genuine Hegelian. The dialectic process constitutes a general form of relation, which permeates the entire system determining the connexion both between its most comprehensive divisions and between its most specific details. Each part of the whole has a formal affinity with every other, and it is therefore psychologically coherent with every other. Each is thus a psychological, as well as a logical, centre and rallying-point for the total system. I have adduced this example, because it seems to be a specially striking one. But every logical system possesses a similar psychological character in a greater or less degree, in proportion as it approaches more or less perfectly to the logical ideal.

The power of an apperceptive system depends on its comprehensiveness as well as on its organisation. A group of political or religious prejudices unconnected by any logical principle of union may derive predominant strength from its mere massiveness. The lack of articulate plan is compensated by the number of the elements which combine to excite and sustain each other. We must also take into account, besides the number and logical interdependence of the components of a system, their mutual cohesion as established by habitual association. This depends upon the frequency with which the system is brought into action.

Finally, we must take into account the comparative excitability of ideas derived from different senses. MM. Charcot and Ballet, following a clue given by Galton, have made us familiar with the classification according to which different persons are ranked as visuals, or audiles, or motiles. The visuals are those in whom visual presentations are most easily and vividly reproducible. The audiles are those in which presentations of sound are predominant. In the motiles, reproductions of muscular experience have the greatest importance. These distinctions have an important bearing on our present subject. The dominance of a special mode of sensibility gives an advantage in the struggle of competing systems to those in which sensory presentations of the dominant kind play a prominent part. Great engineers are likely to be visuals, great musicians audiles, and so forth.

§ 8. *Conflict of Systems.* An apperceptive system may meet with more or less resistance in the effort to incorporate a new element. This resistance may merely delay the process of assimilation, or it may effectively arrest it. It is convenient to distinguish these two cases according to their result as *positive* and *negative* apperception. In positive apperception a mental system actually succeeds in absorbing a new element; in negative apperception the effort to incorporate a new element is defeated. We have now to distinguish between the kind of obstruction which merely delays positive apperception from that which effectively prevents it from taking place. A system can positively apperceive elements which differ from its component sub-groups only in those respects in which they differ from one another. Thus, I recognise an animal as a bird, when it presents a certain general type of structure under special modifications varying from those characteristic of known species of birds in a manner analogous to that in which these vary from each other. Similarly, change in an individual person or thing does not debar identification so long as the alteration is of a kind and degree with which we are familiar. It may also happen that an altogether unprecedented variation fails to present an effective obstacle to the process of assimilation. I may recognise a black swan as such, although I have never seen or heard of any that were not white. In this and similar cases we are accustomed to say that the variation is unimportant, or unessential. For psychology, this means that the divergent feature has no systematic connexion with any conflicting group of mental elements, sufficiently powerful to inhibit the activity of the apperceptive system.

Conflict of systems takes place when one system in assimilating a new element tends to wrest it from its preformed connexion with another system. Positive apperception by the one system implies the disintegration of the other. The latter resists the apperceptive process, simply because it tends to maintain its own existence against destructive forces. In order that conflict may take place the system which is to resist the apperceptive process must be in some degree excited. Under favourable conditions it may be sufficiently excited by co-operation based on the same connexion between the two systems, which gives rise to their conflict. The apperceived presentation forms a link between them through which excitation is transmitted from the one to the other. We must however bear in mind that the effect of co-operation varies according to circumstances.

A group will be more or less excited by co-operation according as it is, for other reasons, more or less excitable at the moment. In this way we can account for the unconscious inconsistencies into which men fall in their mode of thinking and acting. What a man says and believes in the heat of polemical discussion may be very different from what he says and believes in a cool moment. Yet he may never be aware of the discrepancy until he is unpleasantly reminded of it by some one else. Similarly a person's opinions under the influence of an imposing religious ceremony, may vary considerably from those which he entertains in pursuing a scientific or critical research. It is quite conceivable that a professor of anatomy who is also a devout Roman Catholic, may pay veneration to what are alleged to be bones of saints, although his scientific knowledge would constrain him to identify them as the bones of animals.

In cases of this kind the two systems which might conflict and do not, are, usually disparate and disconnected. The points by which they conflict may be almost the only points of community between them. Hence the strength with which they compete is altogether out of proportion to the strength with which they co-operate. Thus the one may easily exclude the other from playing its appropriate part. This can hardly happen when both are co-ordinate sub-groups in a highly organised system.

Conflict itself heightens and sustains the co-operation of the conflicting systems. Each becomes excited by the very effort to acquire or retain the element which forms the subject of their contention. When their strife is prolonged each becomes apperceptive in turn. The same topic is considered alternately from incompatible points of view.

The result of the conflict varies according to circumstances. It may issue either in positive or in negative apperception after a transient struggle. If the apperceptive system is very much more powerful than its opponent, it will speedily conquer by sheer force. This happens when we unhesitatingly entertain a belief in spite of unsolved difficulties. On the other hand, the apperceptive system may speedily encounter so strong a resistance that the apperceptive process is at once arrested. Thus in looking for a particular key in a bunch, I may reject one after another without hesitation until I come to the one I am in search of.

In the third place the issue of the conflict may remain permanently in suspense; instead of a decided result, positive or negative, there may be an unending process of mental oscillation between the two. This happens when we are

permanently unable to make up our minds upon a doubtful question. Again, suspense and vacillation may come to an end in consequence of a series of intervening processes by which one or both of the antagonistic systems becomes so modified that the conflict between them ceases. This may happen in at least two ways. The modification may be of such a kind, as to make it possible for the element which occasions the strife between the two systems, to become incorporated in both of them without further struggle. On the other hand, the ultimate decision may be brought about by a relative increase in the strength of one of them, which is thus enabled to prevail over its opponent by superior force. The "conflict between religion and science" supplies illustrations of both these alternatives. The study of modern science may disturb a man's belief in the literal inspiration of the Scriptures. If his social surroundings, the general character of his pursuits, &c., are such as to confirm his preformed theological tendencies, he will probably, in the long run, "stifle doubt". He may continue to study geology and biology, but he will cease to connect them with the history of creation as contained in the Book of Genesis. On the other hand, if both systems of ideas are strongly developed and favoured by the circumstances of his life, he will probably reconcile them by modifying one or both in an appropriate manner. He will take a broader view of the nature of inspiration; and wherever science seems to leave open a possible choice between alternative hypotheses he will select those which accord best with his theology, even though they would not otherwise appear to him the most plausible.

§ 9. *Suggestibility.* The normal working of competition, co-operation and conflict, may be admirably illustrated by contrasting it with a certain pathological state in which these processes are more or less completely in abeyance. The pathological state to which I refer is called suggestibility. It accompanies certain phases of the hypnotic trance and it is frequent in hysterical patients. In the mind of a suggestible person, apperceptive systems are excited almost wholly by the commands, words, gestures, &c., of another person—and not by their own mutual competition and co-operation. It follows that conflict also is almost absent except in so far as conflicting groups are simultaneously excited by suggestion. Hence arises the possibility of all kinds of strange hallucinations and delusions. In proportion as a subject is suggestible, he is incapable of spontaneously finding difficulties or inconsistencies to interfere with his belief, in what would,

under normal condition, appear to him to be the wildest vagaries of imagination. If he is told that he is the Emperor of China, he straightway proceeds to act and speak as if he were so, without any misgiving. A voyage to the moon will present no more difficulty than the most commonplace incident. If he is told that he is making such a voyage, or has made it, he will accept the suggested situation as if it were real; he will act and speak as if he actually were in a balloon, leaving the earth beneath him. He will then represent the journey as completed and will proceed to discuss the difficulty of returning. This difficulty he can appreciate, because it arises from a conflict within the limits of the total system which is already excited by suggestion. But the general impossibility of the situation never strikes him at all. With the exception of the dominant system the constituent elements of the mind are inoperative. This dominant system exercises an unlimited tyranny. Surrounding objects stimulate the senses, but they fail to call into being any percepts save those which are congruent with the reigning group of ideas. The external stimulus is incapable of suppressing images having their source in suggestion, and of substituting others in their stead. Whatever in the environment is incompatible with, or even irrelevant to, the suggested train of ideas escapes notice as if it were non-existent. Sensory stimulation, instead of interfering with suggestion, becomes auxiliary to it by giving sensuous vividness and definite localisation in space to suggested images. I, of course, refer to hallucinations with *point de repère*. A hypnotised patient is told that a particular person is photographed on a certain blank sheet of paper. She sees the photograph distinctly and localises it definitely and consistently on the surface of the sheet of paper referred to. Double vision of the paper, produced by a prism placed before one of her eyes, is accompanied by double vision of the photograph also. When the paper is mixed with others, apparently similar, she can discriminate it from the rest and she then sees the photograph on it and on it only. Probably most hallucinations have *points de repère* of this kind from which they derive vividness and definite localisation.

In conclusion it must be pointed out that some degree of suggestibility is a general accompaniment and manifestation of mental weakness, whether arising from imperfect development or from disorganisation due to disease or to drugs. A young child is more or less suggestible because its mind is unformed. The mental systems which in the adult resist suggestion are in it as yet too feeble to do so. A

drunken man is suggestible because in him apperceptive systems act in abnormal isolation. This is shown by the fact that in his intoxicated state he says and does what in his sober moments he would be incapable of. He becomes powerless to resist temptation, because restraining considerations are inoperative. A healthy condition of mind is characterised by a general excitability of all the mental systems composing the empirical Ego, which enables them to co-operate, compete and conflict with a comparative strength simultaneously determined by all the conditions enumerated in § 7.

§ 10. *Conditions determining the Train of Ideas.* Attention, being a motor process, depends on feeling. We attend only to what in some measure pleases or displeases us. This dependence of attention on feeling cannot be separated from its dependence on apperception. Feeling is an accompaniment of the general wave of excitement which a presentation produces within the mind as a whole. Under ordinary conditions this general wave of excitement takes the form of an apperceptive process which indirectly stimulates non-appercepting systems by co-operation. Apperception is a condition determining attention only in so far as it is a condition determining feeling. The special function of feeling regarded from the point of view of the psychological mechanism, is to give unity to mental process. It is a simple mode of consciousness resulting from the excitement of a multiplicity of elements, and it causes attention to be concentrated on the central presentation from which this wave of excitement is radiated. The presentation thus singled out by attention, as directed by feeling, serves as the unifying focus of mental activity at the moment.

The word *interest* includes all that is meant by apperception combined with the pleasant or unpleasant feeling, which is its concomitant. The movement of attention is from moment to moment determined by the interest of the presentation attended to.

We must now investigate the conditions which enable a presentation to excite interest. These conditions are, of course, to a large extent coincident with those which determine the comparative strength of apperceptive systems at any moment. But there is another circumstance to be considered. We must take into account not only the comparative strength of apperceptive systems, but also the comparative intensity of the presentations which tend to excite them. The direction of attention is guided coincidentally by

the working of two sets of conditions:—(1) By the relative excitability of different apperceptive groups; (2) By sense-impressions and by preformed associations between prior and subsequent links in the train of ideas. The relative importance of these co-operating conditions may vary greatly. A sense-impression may sometimes appear to command attention by its mere violence, or the succession of presentations in the focus of consciousness may in certain cases seem to be almost wholly determined by the strength and intimacy of the associations which link together the sequent parts of the series *inter se*. But subjective selection determined by the preformed organisation of apperceptive systems and by the conditions which at the moment favour or retard their activity, is never wholly inoperative and as a rule it plays a conspicuous part. Among competing sense-impressions the movement of attention, *ceteris paribus*, singles out those which are most interesting,—i.e., those which tend to produce the greatest amount of change in the most excitable systems. Similarly, when one presentation *a* tends by association to revive simultaneously *x, y, z*, the selection of any one of them, *x*, in preference to the others, depends, *ceteris paribus*, on the special significance and interest of *x*. Association and sensory stimulation bring into the field a limited number of rival claimants, each of which, so to speak, solicits attention. The decision between their respective claims depends on the comparative excitability of the apperceptive systems with which they are severally congruent. It depends also on the nature and degree of this congruence. If a presentation is so conformed to an apperceptive system, that it can be assimilated with a certain degree of facility and rapidity, apperception will as we have seen in § 5 take place without aid from attention. The mental excitement accompanying the process is too feeble and evanescent to occasion a degree of pleasant or painful feeling capable of determining the motor process by which presentations are focused in consciousness. The likelihood that apperception will be accompanied by attention is greater in proportion to the want of congruence between the appercipient system and the apperceived presentation. On the other hand the likelihood that apperception will take place at all is, *ceteris paribus*, dependent on the degree of congruence. A presentation may fail to be apperceived by a dominant system simply because it has not sufficient affinity with it.

In so far as the movement of attention is determined by associations between each presentation attended to and

its successor, the ideas which in turn occupy the focus of consciousness form a connected series or *train*. We have in the ensuing § to consider the distinction between a mere train of ideas and a train of ideas which is also, in a strict sense, a train of thought.

§ 11. *Thought and Association*. When in a train of ideas A calls up B by association, it may happen that A excites interest and attracts attention because it calls into play an apperceptive system disparate from that by which it was apperceived. This is mere "play of association" as opposed to methodical thinking. It is what Hobbes calls "ranging". In idle reverie our thoughts are apt to range or ramble from one topic to another, guided only by casual connexions of ideas. Transitions of this kind are specially characteristic of weak and untrained minds. Disciplined thinking, on the contrary is marked by continuity of interest. A train of thought is a train of ideas each of which is in turn apperceived by the same persistently dominant system. In discussing 'suggestibility,' we had occasion to consider the tyrannical supremacy, which a mental system may acquire simply because other systems are unexcitable and therefore unable to compete or conflict with it. The persistent dominance of the system which gives unity to a train of thought, is of quite a different nature. It is an effect, not of the abolition of competition and co-operation, but of their full and unimpeded exercise. The dominant system prevails over others, equally favoured by the working of association and by sensory stimulation, merely because it is more comprehensive, better organised, &c., than its competitors. The general excitability of the other elements, which compose the mind, as determined by conditions of this kind and by co-operation, remains unimpaired. There is therefore nothing to hinder the conflict of systems. Indeed conflict becomes more frequent and more intense in proportion as thought is more sustained and strenuous. This will be better understood when we have considered the nature of thought more fully.

For the existence of a train of thought it is necessary that the same mental system shall apperceive in turn the presentations which successively occupy the focus of consciousness. But this is not in itself sufficient. Reverie as well as thought may admit of the persistent dominance of the same apperceptive system. It is possible that our ideas as they successively emerge may all have reference to the same general topic and yet they may not be so connected

with each other as to form a train of thought. The ruins of an old castle may carry our minds back into the past, so that our fancies and reflections all have more or less reference to feudal manners and customs. Nevertheless we may wander from point to point in a very desultory manner. In so far as this is the case, there is no thinking in the proper sense. There is only *ranging* within certain broad limits. There is no thinking when and so far as the interest of each successive idea of the train is independent of the relation which constitutes the associative link between it and its predecessor. In mere ranging these relations are not apperceived and in consequence are not attended to. They serve as transitions from one term in an ideal series to another, without appearing in clear consciousness as integral parts of the series. On the other hand, the essential characteristic of a train of thought is that the relation linking each idea to its predecessor forms also a source of the interest through which it attracts attention. In so far as this is the case, the connecting relation itself becomes an object of consciousness; each presentation appears as a further modification or development of its predecessor instead of merely extruding it in an order of exclusive succession. This is what happens when the sight of a ruined castle leads us to recall or to reconstruct its past history, having regard to chronological order and the natural sequence of events.

§ 12. *Proportional Systems.* We have in the preceding § defined the distinction between a mere train of ideas and a train of thought. We must now proceed to consider the ground of this distinction. The essential point to be taken into account appears to be the mode and degree of organisation of mental systems. The affinity connecting co-ordinate sub-groups may be predominantly of a formal kind. It may consist in a pervading analogy of the plan of interconnexion according to which the constituent elements of the several sub-groups are united *inter se*. Thought depends on mental systems constituted in this manner. We may conveniently designate them by a term borrowed from the philologists,—as *proportional* systems. The Hegelian philosophy as it exists in the mind of the Hegelian, is, as we have seen in §7, a signal instance of this mode of mental organisation. But in all normal human minds which have reached a certain degree of development there exist systems approximating more or less to the same type. Whoever has learned in any degree to apprehend geometrical or numerical relations as such, has developed a proportional system—a system adapted to apper-

ceive objects in other respects most diverse from each other, merely because they agree in being capable of entering into certain relations. The pressure of practical needs gives rise even in early stages of mental growth to systems which are to a great extent proportional in their constitution. The special lines of action by which on different occasions we realise the same end, may vary according to circumstances. But these different ways of doing the same thing for the most part correspond in broad outline although they differ in detail. This correspondence is of a formal or proportional kind, because it consists in a certain common scheme of relation connecting the different lines of action with the one end. Variations which do not affect the common relation are unimportant.

Thinking as distinguished from association involves the activity of a proportional system as such. Suppose that such a system S is composed of a plurality of subgroups $a\ b\ c\ d$, $a'\ b'\ c'\ d'$, $a''\ b''\ c''\ d''$, &c., in each of which the component elements are combined according to a certain general type of interconnexion R , so that $\frac{a}{b} = \frac{a'}{b'}$ &c. Suppose, now, that a new group, $a''\ b''\ c''\ d''$, is apperceived by S . This means that its components are presented as connected according to the general scheme R , so that $\frac{a''}{b''} = \frac{a'}{b'}$ &c. Now the whole cluster, $a''\ b''\ c''\ d''$, may be apperceived simultaneously. This is what happens in the case of a geometrical figure which is not too complex to be fully recognised at once. Under such conditions there is no train of thought because there is no train of ideas. On the other hand, it may happen that the several elements can only be assimilated in succession. This happens, when failing fully to comprehend the plan of a piece of machinery at the first glance, we have to examine it in detail successively noting the relation of the parts to each other. In this case we are pursuing a train of thought in the proper sense.

§ 13. *Proportional Production.* The apperceptive activity of a proportional system modifies in a special manner the working of the associations by which ideas succeed each other in the focus of consciousness. The general law of association is that a certain mental activity when it is revived in part tends to be revived as a whole. But this general law may operate very differently according to circumstances. If a has been conjoined with b as a constituent of the complex

a b, when *a* is revived it will tend to complete itself by reviving *b*. This is association in its simplest form. Now, suppose that instead of *a*, *a''* is presented in the focus of consciousness. There is a partial resemblance between *a''* and *a*. Resemblance, so far as it extends, is for psychology, dynamical identity. Hence *a''*, in consequence of its similarity with *a*, will tend to revive the complex *a b*. Such transitions are common in mere *ranging* as distinguished from thinking. They are ordinarily adduced to illustrate what is called association by similarity. But the flow of ideas takes a different course when it is controlled by a proportional system. In such a case the nearest possible approximation to a renewal of the total activity involved in the presentation of the whole *a b*, does not consist in the revival of *a* or of *b*, or of both. The whole *a b* is constituted by *a* as presented in a certain relation to *b*. This constituent relation, when it is congruent with the general scheme of interconnexion which pervades and unifies an apperceptive system, will be more potent to excite interest and attract attention, than the special character of *a* or *b*, which belong to them independently of their combination: *a''* will therefore call up, not *a* or *b*, but *b''* which stands to it in a relation analogous to that of *b* to *a*. This modified working of the principle of association is not merely reproductive. I propose to call it *proportional* or *analogical production*. Excellent illustrations of it are to be found in the working of linguistic analogy. This is a subject which I shall have to take up in the following article. I here confine myself to a quotation from M. H. Paul's *Principles of the History of Language* (Eng. trans.), ch. 5:—

"Mere reproduction by memory of what it has once mastered is only one factor in the words and groups of words which we employ in our speech. Another hardly less important factor is the combinatory activity based upon the existence of proportion-groups. The combination consists to some extent in the solution of an equation between proportions, by the process of freely creating for a word already familiar, in the model of proportions likewise familiar, a second proportional member. This process we call formation by analogy." "Sentences like *Rose a nurse of ninety years* associate themselves with others like *Out spake the mighty Appius . . .* and by such associations we get the equation *rose : nurse = spake : Appius*." "The feeling for a particular function associates itself with the outer form of syntactic connexion, and this function then in common with the exterior form constitutes the bond which holds the proportions together." "It is an incontrovertible fact that a quantity of word-forms and syntactic combinations, which have never been introduced into the mind from without, are able not merely to spring into being by the aid of the proportion-groups, but also from this time forward are confidently produced without the speaker having any consciousness that he is leaving the safe ground of what he has learnt."

A clear and simple instance of proportional production is furnished by certain mathematical series. An arithmetical or geometrical progression, when we have fully grasped the law according to which it is formed, gives rise to a proportional group. To the series 1, 2, 4, 8, &c., corresponds an apperceptive system in which the sub-groups are 1 : 2, 2 : 4, 4 : 8, &c. In the development of such a series, each term suggests its successor according to the general form of transition. The identity of relation between successive terms progressively creates new terms different from those which precede. Ideal trains of this kind are strongly contrasted with such simple reproduction as is implied in the mere repetition of a verbal formula learned by rote.

I do not venture to affirm that we can divide all cases of ideal recovery by association into two absolutely distinct classes. Possibly there is no instance of the suggestion of one idea by another in which a strict scrutiny would fail to discover the operation of proportional production. Absolutely simple reproduction is perhaps a fiction in the same sense as a perfectly rigid body or a perfect fluid is so. But it may be in some cases legitimate and convenient to neglect the influence of proportional production on the train of ideas, just as it is sometimes legitimate and convenient in hydrodynamics to neglect the viscosity of a fluid. Thus in dealing with what Prof. Bain calls "routine or use and wont," we may neglect proportional suggestion, whereas for the treatment of intellection and constructive imagination, it is all important.

A comparative anatomist on seeing part of the skeleton of a well known animal is reminded of the whole to which it belongs. This is simple reproduction: *a* having been co-presented with *b*, on its reinstatement, recalls *b*. Instances of this kind are usually chosen to exemplify association by Contiguity. When the anatomist, on seeing a skeleton having a certain type of structure, is reminded by it of another of a more or less similar type, the process may still be regarded as simple reproduction: *a* recalls *a* through their common part or aspect *x*. Instances of this nature are usually chosen to exemplify association by Similarity. Finally we have a well marked case of proportional suggestion when an anatomist, having before him part of the skeleton of an unknown animal, reconstructs the rest from analogy with known types of structure. In this case *a* calls

up β , because $\frac{a}{\beta} = \frac{a}{b}$.

§ 14. *Thought and Conflict.* I have said that conflict becomes more frequent and more intense in proportion as thought is more sustained and more strenuous. The reason is that in a process of thought, the presentations a^n b^n c^n which are successively incorporated in the same ideal system may be regarded as constituting a single complex presentation, so that the successive apperceptions are stages in the comprehensive process by which this complex comes to be apperceived as a whole. The dominant system tends to assimilate each successive presentation simply because it is an integral part of the series, notwithstanding the incongruous adjuncts with which it may be connected. If a lawyer has once proposed to himself to defend or prosecute on lines of a certain theory, he is bound to do his utmost to make all the details of the case fit in with that theory. He is accordingly almost certain to meet at some point or other with circumstances difficult to explain. In this instance, the conflict takes place between the inward flow of ideas as determined by proportional production and data furnished from other sources, such as the evidence of witnesses. A number of circumstances interpreted in a given manner prescribe in advance to a certain extent what the nature of the remaining facts must be if they are to fit in with the theory. If they turn out to be at variance with the anticipations thus excited, conflict ensues. Conflict may also originate in self-contradiction. The inward flow of ideas as determined by proportional reproduction may of itself call up presentations which have implications precluding their incorporation with the dominant system.

We have already had occasion to examine the various results of conflict. It is necessary here to add that sustained and persistent conflict occurring in the course of a train of thought, tends to produce a suspension of the onward flow of ideas and a regressive process by which the movement of attention starts afresh from a previous link in the ideal chain. Its new course is not however, as a rule, a mere unchanged reiteration of the previous line of reproduction. New terms may be introduced into the series and others discarded from it. In this way the total presentation formed by the union of all the successive terms, may become modified so as to admit of being incorporated in the dominant apperceptive system. The constituents of the complex whole, which previously offered an insurmountable resistance may be omitted, or their relation to the whole, may be so modified that they cease to occasion any serious conflict. Inconsistencies, which at the outset hinder the

lawyer from making out his case, may disappear when reconsideration of the circumstances suggests new possibilities to his mind. I have already discussed other processes by which conflict may be brought to an end. These processes play an important part in removing the difficulties which arise in the course of a train of thought. They are not however essentially connected with thought as such. They may take place independently of it. But the reversion of attention to previous links in the train of ideas, giving rise to a modified repetition of it, is a distinctive feature of *thinking*.

I have now discussed in a broad and general manner, the nature of Thought in so far as it is possible to do so without reference to Language. In the following article, I propose to deal with the special part played by words or signs of a similar nature in the process of thinking. The basis for the treatment of this topic is already laid in the present paper. I hold that Language is from a psychological point of view a peculiar movement of attention having a peculiar influence on apperceptive process. Whoever has been able to follow me in my treatment of Attention and Apperception will I believe have no difficulty in following my treatment of Language.

III.—HELMHOLTZ'S THEORY OF SPACE- PERCEPTION.

By J. H. HYSLOP.

I.

IN MIND No. 52 I had occasion to allude to Helmholtz's theory of "unconscious inference" as the source of the visual perception of space while criticising Wundt's theory of "psychic synthesis". In the course of that criticism I briefly referred to certain phenomena, those of localisation in accordance with the degree of binocular adjustment, as effectually disproving Helmholtz's explanation of the binocular perception of depth by "unconscious inference". But as the objection to this theory obtained its force from the fact that we were dealing with binocular phenomena only, while it may be that the perception of space, in its last analysis, must be explained by monocular functions, I wish to return to the question from a modified position and to examine Helmholtz's theory in the same spirit in which I treated the views of Wundt. But the nature and import of his theory must first be made clear.

The doctrine of "unconscious inference" is explicitly founded upon Helmholtz's general theory of knowledge. This is done both in his *Popular Scientific Lectures* and in his great treatise, the *Physiologische Optik*. We have in this fact a very fortunate means of knowing just what philosophic significance to attach to his special view of space-perception. It will seem a paradox to all who are acquainted with Helmholtz as an empiricist, especially in regard to the origin of the idea of space, to say that his theory of knowledge is essentially identical with that of Kant. But this is clear to the student of philosophy, and it may moderate the opposition to Helmholtz's empiricism if sympathisers with Kantian idealism take account of the fact. True, this identity does not rest upon the conception of space by which Kant conditioned the character of his theory of knowledge. For in transcendentalism the conception of space upon which the theory depends is both *a priori* and ideal; while Helmholtz, at least in the sense of sight, distinctly denies the *a priori* nature of space, without, however, asserting anything *pro* or *con* regarding its ideality. It is clear that the nativity and the ideality of

space are not interdependent, or mutually implicative of each other, for the reason that there is nothing in the historical genesis of our conception of space to determine what its intrinsic nature is, except that in the investigation of the one we may discover what the other may be. Hence there is nothing to prevent a man from being an empiricist regarding the origin of the idea of space and at the same time a transcendentalist in his theory of knowledge. This is what Helmholtz is, although he may not be consciously so. The fact will be evident, however, if his theory be presented in its main features and its relation to Kant.

In the third section of his *Physiologische Optik* Helmholtz goes into a long digression upon the theory of knowledge in general, expressly stating that it is designed to prevent those who have reflected upon the nature of sense-experience from misunderstanding the nature of his own doctrine in regard to space. The first remark in this connexion is that he regards sensations merely as symbols for the relations as well as the existence of an external world, and that he excludes from them every resemblance or similarity with that which they indicate. The latter statement was designed to express the doctrine that there is no pre-established harmony, or representative similarity, between objects and impressions, a view upon which Helmholtz lays great emphasis and which he opposed to what he thought was assumed by the theory of nativism. But it can be replied to this that nativism does not necessarily make any such assumption as that there is a pre-established harmony between objects and "ideas" as presented to sense. It is true that nativists have often enough done so: but it was because they were realists of a certain kind, or were under the domination of certain preconceptions in physiology at the same time, and not because they were nativists. Helmholtz ought to have remarked here the very important case of Kant, who was a nativist, and whose view of the distinction between noumena and phenomena corresponded to his own. Nativism in its proper conception and sphere refers only to the *historical* relation between space-perception and the sensations with which it is connected. But aside from this criticism upon Helmholtz's position, which is always important to keep in mind, his conception of sensation, described as symbolical of something unlike it in reality, is immediately repeated in a statement which identifies his position with that of Kant; namely, that "our impressions, are effects which external objects produce upon the sensorium and consciousness". There is only the substitution of "effect" for "symbol" in the passage; and then, to

repeat his idea about the difference between objects and impressions he is careful to emphasise the fact or supposition that there is no other kind of truth in our presentations of sense than a practical one. Upon this, the reaffirmation is made that our sensations can be absolutely nothing except "symbols" which are used for regulating our movements and actions.

But in thus setting a chasm between reality and experience—a chasm which he observes is admitted by all schools alike—he raises the old question: How can we know the external world at all? Helmholtz's answer to this question is, that our knowledge of objects is an inference or construction from the *a priori* conception of causality. He recognises with Kant that the data of knowledge are the facts of experience, sensation, or consciousness. These require their meaning to be determined, as they indicate nothing of themselves. They are effects which require a cause to explain them, and hence, by a process of inductive reasoning, objects and their properties, so far as they are realities apart from experience, are simply inferred causes according to an *a priori* law of mind; though this posits, instead of the twelve Kantian categories, only the one category recognised by Schopenhauer, that of cause and effect. It is apparent at once that there is a close affinity between the two views compared, although there is a difference of opinion, or perhaps of language, in regard to origin of the conception of space. It will be noticed also by most persons that the manner in which Helmholtz employs the function of inference would seem to identify him with the "hypothetical realists" or the "cosmothetic idealists" rather than with transcendentalism. This is at least in a measure true, but not to that extent which would exclude a comparison with Kant. Neither his empirical view regarding the genesis of space nor his use of inductive inference, both of which seem to have been borrowed from English sources, the former from Berkeley and the latter from Mill, in the least contradict the supposition that his general theory of knowledge is identical with that of Kant; because, unlike Mill and his school, he bases his theory of knowledge and perception upon the *a priori* idea of causality, and lays such emphasis upon the denial of any pre-established harmony between the external world and the nature of perception that no essential antagonism can be conceived between him and the great transcendentalist. This is important to keep in mind when considering the relation between his theory of the genesis of space and the general metaphysics of Kant. For it has been a common

assumption that any application of the term "empirical" to the genesis of space-perception was a contradiction of Kant's philosophy. But it is a sufficient refutation of this assumption to know that Wundt, who distinctly claims to be an empiricist, urges his view as a better proof than Kant's arguments of the ideality of space and by consequence of the general Kantian philosophy. But the most decisive proof of the affinity between Helmholtz and Kant is Helmholtz's language where he sums up (*Physiologische Optik* § 26, p. 456) the historical views in regard to sense-perception, and states that his own investigation applies to the problem which Kant did not consider, namely, the perception of particular or concrete spaces. This fact, with his acceptance of the *a priori* nature of causality and of the idealist position in regard to things-in-themselves, shows a closer relation to Kant than to the English sensationalists from whom he has largely borrowed, and it is a fact which will go very far to determine the character of Helmholtz's empiricism and his real conception of space as considered under that theory.

But after laying down the doctrine that our knowledge of the external world is an interpretation or inference from the data of sense, he finds it necessary to distinguish between this process and that process of inference in which the data are consciously known to be signs. The common mind, being without a reasoned philosophy, is not aware that sensations are only signs of things. It does not suppose for a moment that there is a chasm between realities and impressions, which has to be bridged by peculiar intellectual processes. On the contrary, it imagines a power of directly perceiving things, and even the most advanced philosopher finds the directness of this knowledge a matter which his theory must respect. Hence, if we are to call the process by which a knowledge of externality is gained an inference of any kind, it must be by drawing a distinction between it and that form of inference in the experimental sciences where it is recognised that the data, which are symbols of what is beyond them, are consciously known to be data requiring interpretation. This distinction Helmholtz draws by calling the inductive inferences of the sciences *conscious* (*bewusste Schlüsse*), and those involved in external perception of world *unconscious* (*unbewusste Schlüsse*). It will be clear from this position that his theory of space-perception is but a special application of his general theory of knowledge and must be criticised accordingly. Had his doctrine of "unconscious" inferences been a loose adaptation of the idea expressed by Berkeley in the following language, it would have been less exposed to

critical objections:—"So swift and sudden and *unperceived* is the transit from visible to tangible ideas that we can scarce forbear thinking them equally the immediate object of vision". But the general character of the theory forbids our supposing that the expression "unconscious" was used loosely and in a random way, merely to express the readiness with which certain phenomena were interpreted and the construction of an external world given as their meaning. No doubt, Berkeleyan conceptions contributed to the view, but helped rather to the conceiving of the process as an inference than as an "unconscious" one. The extension of "unconscious" to the whole of perception as an inference was going beyond anything Berkeley dreamt of. It is a position that affiliates more readily with Kant, as is evident from the philosophy of Schopenhauer, who influenced Helmholtz in more ways than we have time or space to indicate. The fact that the inference was regarded as "unconscious" gave it all the directness or immediacy of an intuition (*Anschauung*), especially when it was supposed to be regulated by the *a priori* conception of causality. These considerations afford us two results. The first is that they exhibit a form of empiricism which is not absolutely opposed to transcendentalism, as is too often supposed by careless inquirers into the nature of Helmholtz's theory. The second is that a position is reached from which we can undertake an analysis and criticism of the theory. This criticism will be directed upon the theory in general and upon its application to the perception of space in particular.

The general and the particular theory had the same object; namely, to oppose every form of apriorism, at least in so far as any such system advocated, or seemed to advocate, the original consciousness of what are really complex conceptions, or the definite perceptions of objects which require experience to give them the clearness and complexity assumed by them in the mature consciousness. But admitting that this is a laudable purpose, the manner in which Helmholtz formulated his theory may be open to the charge of involving a contradiction. On the one hand, the theory of "unconscious inference" supports the empirical doctrine of perception only in consequence of calling the process an inference. Inferences require experience for their development, because they imply two terms, and these two terms must represent either successive experiences, or a characteristic in one experience which has been coexistent with another and suggests it. In both cases the inference is conditioned by a comparison of data which appear at

different moments of consciousness. On the other hand, to call the process "unconscious" is to restore the conception of immediacy which the idea of inference is supposed to exclude. The characteristic of an inference, as usually understood, or of the conscious inference which, according to Helmholtz, constitutes the process of the inductive sciences, is that the data from which the inference is made are consciously known to be symbols of something beyond them, and which they do not represent or contain. Thus, if in looking at a table I infer from certain peculiarities of colour and texture that it is made of oak wood, or if I infer from the appearance of a cloud in the sky that it is raining in a particular locality, I have before me certain visual facts which are not the object of the inference, but which are co-existences or causes that have once been connected with these facts, or so often connected with them that they are supposed to be there in this particular case, and only await the proper means of verification to prove the inference.

In such cases the mind knows that its data are signs, and it distinguishes between the sign and the object which is not perceived at the same time or in the same way. But in the so-called "unconscious inferences" no such distinction can be admitted. They are called "unconscious" for the very purpose of indicating that there is no immediate knowledge of the sign as distinct from the object, and, in addition to this, the position is never reached which considers sensations as mediate signs of an unknown object, except by speculative philosophers. In saying this, we do not wish to discredit the view, but to present the facts which move investigators to class the fundamental processes of perception with those of inference. Now, in employing the term "unconscious" to describe them and to indicate the absence of precisely that quality in general inference which makes it empirical or derived by experience, we at once lose all that we had gained by calling the process an inference, in so far as any controversy between nativism and empiricism is concerned: and unless a refutation of nativism is effected by it, the theory can dispense with the term "unconscious" altogether; indeed, must dispense with it in order to retain alliance with empiricism. If the terms were used only in a loose sense to denote great readiness of perception, and distinguished from ordinary inference only in the readiness with which the mediate act of mind was performed, there would be little objection to it. But a well defined theory can never be founded upon conceptions that are loose and indefinite. Philosophers are right in de-

manding that conceptions defining a theory shall be clear and accurate, and the only way in which we can distinguish accurately between a conscious and an unconscious inference is to hold that the latter denies the quality which characterises the former; and, as conscious inferences or inferences in the inductive sciences start with facts and an unknown object of search, the "unconscious" inference must be without these mediating terms, so that consciousness in such a case would not distinguish between the sign and its object. But, as we have said, this surrenders all the presumptions in favour of empiricism. Outside of its relation to the dispute between nativism and empiricism, the doctrine can be supposed to have some merits. For the manner in which the distinct experiences of disparate senses are connected is very suggestive of the general function of inference when the connexion is conceived without the synthetic unity of consciousness; that is, the simultaneous realisation of different experiences, and the readiness with which it is done, might very well suggest a contrast with the hesitancy which so often accompanies ordinary inferences. But even here it can have only a provisional value, because scientific, philosophic and logical accuracy require that there should be a necessary exclusion between nativism and "unconscious inference," on the one hand, which there is not, as we see in the cases of Kant and Schopenhauer, and that, on the other hand, the form of the expression or theory should not be exposed to the charge of being a self-contradiction. As long as these conditions are not fulfilled, the theory cannot be opposed to any of those which it is designed to correct or supplant. It can only be used to shift the point of view for facts, or to supplement the incompleteness and one-sidedness of other theories.

The criticism of its application to the special case of space-perception involves the same arguments as those already presented,—with one modification which must be indicated, because of the misunderstanding which men like Ribot seem to have regarding the problem Helmholtz is endeavouring to solve. I have indicated that he distinctly states his problem to be the perception of definite spaces, and that this was not the problem which Kant discussed. He does not state, though he very clearly implies, that he is at one with Kant in regard to the *pure* perception of space, and so limits his problem to the question whether our perception of particular distances and magnitudes is native or not, and what are the means or conditions of this perception. But if the process of perceiving definite distances and magnitudes is an "un-

conscious inference," and if an "unconscious inference" is in no way opposed to original mental acts, then even the particular spaces of ordinary experience become native perceptions, or so nearly these that the consequences of the difference between nativism and such a view cannot be very important. The argument is an *a fortiori* one for *pure* space, or the instinct of the mind to perceive space at all; so that those who resort to Helmholtz for aid against Kantian theories are indulging a forlorn hope. But such weaknesses as we may thus indicate in the theory of "unconscious inference" are mainly applicable to it when abstract space is supposed to be its object, and hence do not mean to deny it cogency in so far as elements of *inference* may be involved either in the complex and synthetic conceptions of space as a common sensible, or in our definite judgments of distance and magnitude. I do, however, intend to intimate that this act cannot be regarded as "unconscious" without forfeiting every right to antagonise nativism or support empiricism by it. Even if we do not regard the expression "unconscious inference" as a self-contradiction, the process cannot define any such antithesis between these two theories as the unqualified conception "inference" can do; because its "unconscious" character gives it a directness which is either incompatible with ordinary conceptions of empiricism or makes the difference between that theory and nativism very unimportant.

With this conclusion and the equivocal character of Helmholtz's theory presumably established, and with the still more important postulate fixed in our minds, that our views about the genesis of definite space-conceptions can never be transferred to *pure* space or that space-construction of phenomena which is an invariable function of consciousness apart from its development by experience,—we may proceed to consider the elements of truth in the position of Helmholtz in so far as he proves the existence of inferential functions in space-perceptions, even if we are tolerant enough to admit their "unconscious" nature in the loose and untechnical use of that term. I am convinced that there are native and experiential elements in the process taken as a whole, and that it is no longer possible to maintain without qualification one or the other of these theories. The problem is too complex for so easy a solution, while it should never be forgotten that even empiricism always requires a basis of natural data upon which to found its influence of experience.

The crucial incident, which seems to have originated or to have effectively substantiated the view that visual perception

of distance was inferential, was the fact that plane dimension has, and solid dimension has not, a representative in the retinal image or impression. As soon as physiologists discovered the existence of a retinal image like that in the camera obscura, they were ready with an explanation for the perception of magnitude, but the very force of this explanation created a difficulty which intuitionists before that time had not to contend with. There is no similar organic arrangement discoverable for the third dimension, and no known possibility that the retinal impression should have a representative of solidity in it, at least with any such correspondence between it and solidity as appears in the retinal image and its correlate magnitude or plane dimension. The most natural explanation, after admitting this anomaly, was a process of inference based upon visual signs, consisting variously of organic, muscular, and colour sensations having different degrees of clearness. In this view of the case the typical conception of trinal dimension was supposed to be given by tactual and muscular sensations in connexion with bodily movements, and then its existence inferred by certain visual signs which experience showed were frequently or invariably connected with solidity. This is, in brief, the position taken by Berkeley, Mill and the associational school generally, and the incidents which support it are numerous enough to prove that, whatever native functions are allowed to vision for perceiving solid dimension as a visual percept, the connexion (or identity and coexistence) of this percept with the third dimension of tactual and muscular experience is complicated with inferential processes. But if the claim be set up that visual space is distinct from tactual space, as a presentation of sense, admitting an associational synthesis for identifying them in reality, and that there is no pre-established harmony between impressions and their causes or objects, the anomaly supposed to exist in vision at once loses its significance and ceases to be an anomaly. Hence there would be no ground for using inferences, conscious or unconscious, to explain the phenomena of vision: for the only suppositions which necessitate a resort to illation are, that there is an anomaly between the perception of magnitude and that of distance by sight, and that tactual or muscular conceptions of solidity are the only conceptions we have of externality or of dimension other than plane dimension. Now Helmholtz's denial of pre-established harmony, as well as the fact that he makes the visual perception of magnitude experiential and so not definitely correlated with the retinal image, exclude his right to use

the first supposition; and the phenomena of binocular adjustment which I discussed in my previous article exclude him from the second. For those phenomena showed in the visual consciousness a *qualé* which, with or without its relation to tactual and muscular extension, was other than plane dimension. Hence unless this *qualé* can be proved to be the result of inference, Helmholtz must limit the application of his theory to the synthetic connexion between touch and sight. Those, indeed, who do not make his assumptions about the perception of magnitude and the antithesis between sensation and reality will not be exposed to our criticism. But with them we have nothing to do at present. We have only to find the nature, limits, merits and demerits of the theory of Helmholtz.

The first fact to be observed in connexion with the limitation imposed upon his empiricism is that Helmholtz distinctly admits in his *Popular Scientific Lectures* (p. 238, American translation) that the perception of space in touch is native. This of course contradicts his universal application of "unconscious inferences" to perception at large, unless we assume, as we have endeavoured to show, that such a doctrine is compatible with, or even implies, nativism. The contradiction is between his use of it as an empirical theory and his application of it universally while space-perception in touch is made native. I shall not push this single instance too far, as it was very probably a slip of the memory or an unwary concession to earlier views, and the emphasis of his doctrine is so pre-eminently laid upon vision that it is hardly fair to measure its integrity by a casual remark in a popular work. Still the trend of his argument, although I am aware of no definite statements to this effect, bears traces of the very conception which would lead to such a remark. However, since I am not solicitous to give a complete refutation of his view, I pass on to mention the more important limitation to the application of his theory. This, as already indicated, is the fact that his fundamental principles—the denial of pre-established harmony and his assertion of the experiential nature of visual magnitude—do not allow him the assumption of such an anomaly in the visual perception of plane and solid dimension as would require an appeal to inference in order to explain the consciousness of distance not actually given in the data of the visual sensation. Hence he can consistently with his own principles apply the theory of inference only to the synthetic conception of space as it represents the unity of visual and tactual percepts. There is undoubtedly here a large and legitimate

field for inferences, whatever we may choose to call them in reference to their directness; and Helmholtz could not have chosen in support of such inferences a stronger set of phenomena than optical illusions, of which there are a great number affecting the perception of distance. But it is not my purpose to go into the common arguments for the presence of inferential elements in the vision of space. My intention rather is to discuss a class of phenomena in this connexion which have not generally received due attention, as showing that, even if other facts make the visual perception of distance direct and natural, they may on emergency be supplanted by influences which accomplish the same result through inference. This is not to indicate that there is no visual third dimension, but that there is an interesting *quale* in the visual sensation which possibly helps to complete the definite perception of visual solidity by inference, and certainly helps by the same process to identify visual with tactual and muscular space. This class of phenomena is comprehended mainly under the head of *parallax of motion*, an influence which seems to do the same for monocular vision that adjustment and fusion do for binocular vision. The parallax of motion consists of the different apparent movements or velocities of bodies in horizontal meridians and situated at different distances from the observer. Thus, if the eye is fixated upon a given point and the head moved from side to side without changing the fixation, all objects nearer the observer will have an apparent motion across the visual field. The same is true of all objects beyond the point of fixation. These are commonly known facts. But certain aspects of their significance are not so commonly known, although the influence of the parallax of motion upon the perception of distance has not passed unobserved by Helmholtz.

II.

In binocular phenomena, such as stereoscopic relief in the fusion of geometrical figures constructed with a view to that effect, and localisation according to the kind and degree of adjustment, there is, as I showed in MIND No. 52, no room for inference. The perceptions seem as direct and as reflex as those of colour, and variations are not accompanied by any illusions, to which the process of inference is always incident. But since all are agreed, even if this binocular perception of solidity be a natural function, capable of very ready adaptation by experience to the conception of tactual and muscular space, that in the last analysis the perception

of space, and so of solid dimension, must be relegated to monocular vision, where we cannot take account of convergent adjustment—we have to ask how distance can be perceived monocularly, when there is nothing but a plane image upon the retina, and when we cannot suppose the existence of organic muscular sensations from convergence or divergence as a basis for inference. The reason for considering the problem ultimately as one of monocular vision is, that we are always as conscious of solidity and distance when binocular functions are suspended as before. If the perception of the third dimension were due to binocular processes only, then the field of monocular vision would present nothing but a plane. The fact is that those who are blind in one eye perceive distance with the other quite as accurately as those who use both eyes, although some experience is required to produce accuracy. The fact also that any one, in closing one eye, has as decided a consciousness of perspective, although not so distinct or clear, as with the two eyes, has very great weight. But the very incident that it is less distinct is a presumption in favour of its being inferential in such cases, especially when we learn that in many crucial instances objects appear in monocular vision to be situated in a plane which are instantaneously localised by binocular vision in the third dimension. Prof. Le Conte's application of Dove's experiment to monocular vision is a proof of this.

There are two facts which serve as a check to hasty conclusions in the matter of monocular vision. One of them I have not seen mentioned by any writer; the other is a matter of common note. The first is that, even when one eye is closed, the adjustments of the open eye are always accompanied by those of the other eye; not, indeed, so perfectly as when both are open, yet sufficiently to make very forcible the suggestion that the muscular sensations, or adaptation which thus conform to ordinary experience, may account for the localisation which is generally assumed to be monocular, but which is really binocular, and is less clear because of the anomalous absence of one of the retinal images. This will be a fact of some weight to adherents of the theory of muscular sensations and of "psychic synthesis". But it is materially weakened by the consideration that we are not conscious of adjusting the closed eye simultaneously with the open one, and can prove the fact of this motion only by suddenly opening the closed eye after the adjustment of the other eye has taken place, when it is discovered that the adjustment of the closed eye has been partly effected.

Again, the marked degree of imperfection in this adjustment, with perhaps no disturbance to perspective in many cases except in respect to clearness, argues a diminished importance in the fact, so that its cogency for the continuance of binocular influence in what is presumably monocular only is very much impaired. The second fact is assumed by many to have considerable force. It is the fact of focal adjustment or accommodation which is the muscular analogue in monocular vision for convergence in binocular vision. The perception of distance is supposed to be due to this influence whether we choose to regard it as direct, as an element of "psychic synthesis," or as an inference from the organic sensations which it may produce. But there is more than one objection to this, of considerable force. The first is that in Le Conte's application of Dove's experiment accommodation either is not capable of as sensitive a reflex as binocular parallax, or it has no influence of an essential kind upon the determination of perspective. In either case, it cannot be appealed to on the ground of its muscular character: in the former case, because whatever focal adjustment is initiated by the appearance of the electric spark is not accompanied by any discoverable localisation in accordance with it; and in the latter, because a difference of locus between the point of fixation and that of the adjustable body is not observed. A second objection, of greater weight, is based upon an experiment which I have performed hundreds of times, with a result invariably the same. It is an experiment showing apparent translocation of objects in the monocular field when changes of focal adjustment are effected, which is proportioned to the changes of retinal magnitude and distinctness, not of the accommodation, as would have to be the case if focal accommodation were the principal agency in the result. Thus, if I close one eye, and voluntarily change the accommodation for a nearer point of fixation than a window across the street, or any other object, the magnitude of the object decreases; and, by alternating this change as rapidly as I can, the object seems to move to and from me, but always *in the direction opposite* to the change of accommodation, and precisely in accordance with the apparent changes of magnitude in the image. Again, if I instigate the same changes of accommodation while looking at a distant gaslight, the light seems to move toward me when the focal accommodation is for a nearer point, and away from me when the accommodation is relaxed or fixed upon the gaslight. This would accord with the supposition that the translocation

was due to focal adjustment; but it is significant that in this case the apparent magnitude of the image or light is *increased* when adjustment is effected for a nearer point, and *decreased* by the reverse adjustment, a fact due to a dispersion of luminous rays not possible or not noticeable in the former case: so that the localisation is in accordance with the changes of apparent magnitude, and not the changes of accommodation. This is strongly confirmed by the uniform experience that, if the accommodation be sudden from one point to another and not graduated, even a change of apparent magnitude is accompanied neither by an apparent motion nor by a change of localisation. Accommodation may be a contributing factor in monocular localisation, although there is much to dispute its claims to any consideration at all; the present problem does not require us to settle the matter. But whatever may be claimed for it as a factor, the incidents I have mentioned certainly prove that accommodation is not the prerogative factor in the monocular perception or judgment of distance. If it were the chief incident in such perception, it could not be the basis of an inference, because, in all normal cases, it gives rise to no organic sensations, and we are not conscious of its occurrence. It could only be a source of immediate perception, unless we wished to repeat all the absurdities of "unconscious inferences". But if accommodation is not adequate to produce monocular perspective, and does not present a basis for inferential functions in monocular localisation, the parallax of motion does supply these data, although it is not necessary to suppose that it excludes the presence of other inferences in the direction of the same result. It is an influence affecting the consciousness of distance when others are ineffective or inactive. The force and value of this influence to explain monocular localisations must be learned from the experiments to be described. It only remains to determine whether the process is inferential or not.

We shall not assume dogmatically that it gives rise to an inference, because the problem is so complex that we can well conceive the existence of some peculiar innervation, or some psychical activity distinct from inference, to account for the perception. But if this be the case it may be best to arrive at such a supposition through testing the hypothesis of inference occasioned by the parallax of motion. The ground for supposing the consciousness of distance to be an inference when it is instigated by the parallax mentioned is, that the images either seem to lie in the same plane, or the tridimensional distance between them is not

so distinct, until the parallax of motion reveals their true position. These phenomena correspond exactly to the conception of those who hold that the representative of plane dimension in the retinal image decides the nature of all perceptions whose character is not presented in the image except as a visual sign, and hence that aught beyond magnitude must be the result of inference. The experiments themselves will show the force of this view. Three of them have special value because they were not instituted for the purpose but were incidental discoveries in a purely casual experience, so that no antecedent conceptions and associations interfered to affect the appearance of the phenomena.

Looking out into the open air through a window which was closed by a shutter with open slats and by a fly-screen inside the shutter, I observed that the wires of the screen seemed to be located beyond the shutter, and at once recognised that the effect was due to binocular combination and fusion of images. While watching the phenomenon I made a slight motion, and observed immediately that the screen then seemed in its right place nearer than the shutter until binocular influence again translocated it beyond the shutter. I repeated the experiment a number of times, and always with the same effect. The second incident occurred in much the same way. A screen stood near the wall, about an inch and a half from it, and my eyes were about two feet from the screen, with a gaslight behind me some feet and at one side, so that I could observe the shadows of the wires upon the wall only a slight distance at one side of the wires. There was no difficulty in perceiving that the shadows were farther off than the wires as long as the vision was binocular. But when one eye was closed, the shadows and the wires seemed to be located distinctly in the same plane until the slightest motion of the head restored the true perspective as clearly as binocular vision. The parallax occasioned by this motion was instantaneously discoverable and the objects did not seem to lie in the same plane as before. But a more remarkable instance of the same phenomenon was the third. While engaged one day in reflecting upon a subject with my head resting upon the back of my chair, and looking across the street, I observed what appeared very distinctly to be a spot upon the window-pane on the opposite side of the street. By closing one eye I observed that the spot retained its apparent localisation although not so distinctly as with both eyes. While thus looking at it, I moved my head slightly and discovered suddenly by the parallax of motion that the spot was on the window not more than two

yards from me. Curious to know why the illusion had been so complete I opened the eye that had been closed and kept the fixation upon the farther window with the assurance that binocular vision in connexion with the homonymous character of the spot's images would make it appear in its proper place nearer than the point of fixation; but to my surprise it appeared more distinctly than ever to be located on the farther window. I determined to examine it more closely, and soon found that there were two spots on the window near me just far enough apart to combine when the eyes were adjusted for a point in the farther window, so that the case was one of true binocular translocation of images. In repeating the experiment variously, I found that the parallax of motion would overcome the binocular localisation of the spot upon the farther window and restore it to the nearer window, as the same cause always made it appear nearer in monocular perception.

To those who start from or assume the representative nature of the retinal image as the condition for the perception of plane dimension, the phenomena just described will seem to confirm the supposition that solid dimension is an inference, because distance found no equivalent in the impression until the parallax of motion appeared, and in this the most apparent fact is that no datum was added to it in any way to make distance a representative in it. Even if we suppose the possibility that some innervation or neural process of a peculiar kind identical with or constituting the visual construction of the third dimension might exist, it would seem equally possible to many that inference could accomplish the same practical result by regarding the parallax of motion as a sign of a conception otherwise obtained. This other source may safely be assumed to be touch, and this fact will bring the phenomenon entirely within the reach of the general theory of inference. This of course is but to place the matter where Berkeley left it; and, in so far as the association of tactual and visual percepts is concerned, perhaps few will question the influence of inference, and hence I need not argue it. But there is an incident in connexion with the phenomena which so far confirms the supposition that the connexion between the two senses is inferential and that the parallax of motion is only a sign upon which such an inference is based, that it may well be emphasised. It is the fact that, in such cases, whenever the mind endeavours to form a clear idea of what the parallax means, it resorts most naturally to analogies in touch and muscular experience, or to the conceptions of binocular

localisation; in which fact is indicated that the parallax of motion derives its meaning from some other conception and so is an interpretation in its reference to solidity, rather than a perception. Whatever else it may give rise to, it is accompanied by inferences which coincide in their results with any other assumed process. If we assume anything else as an original datum of visual extension apart from tactual, there will not be any dispute about the fact that the identity of this datum with the tactual, or the passage from the visual sign to the tactual *quale*, is inferential, and to that extent a clearer case than that of retinal magnitude and distinctness is made out for the presence of inferential functions in the visual perception of distance.

But as this conclusion can be admitted without necessarily proving Helmholtz's theory, it remains to ask whether the parallax of motion in such phenomena as have been described will be a visual sign for an inference to the visual third dimension represented in binocular fusion and parallax. Helmholtz is not limited in his theory to the connexion or associations of tactual or visual extension, as was Berkeley, because he gives his theory of "unconscious inferences" a scope covering all forms of sense-perception; although farther examination might prove that the theory can be maintained only upon those limitations. But since he denies all pre-established harmony between impressions and objects, it would seem that this parallax of motion could very well be regarded as a sign of a dimension which the visual impression itself is not. And, if we go outside the special cases described to those where the parallax itself has to be inferred from certain visual data—such as the more rapid approach or separation of objects horizontally, when the observer changes position from side to side, than would be if the objects were in the same plane—we shall find an unmistakable case of the influence of monocular parallax where binocular vision is ineffectual, and that influence is one of inference twice removed. So much, then, can be said for the co-operating agency of inference in making up the total consciousness of space; and this influence is enough to make quite pardonable the construction of a theory upon that basis alone. As the parallax of motion is the chief factor in the great variety of phenomena producing such a result, it may be accredited with being the visual sign required.

The view here taken is corroborated by farther interesting experiments illustrating the influence of the parallax of motion. I have often tried the experiment of looking with one eye at the reflexion of an object in a mirror. If the

mirror is an excellent one with fine reflecting powers, the localisation even in monocular vision will be tolerably good, perhaps as good as when the object is looked at directly. But if the surface of the mirror is imperfect, heavily coated with dust or otherwise affected, so as to make it quite visible and to present objects that will affect accommodation when attention is given to them, the reflected images of other objects may seem to be located in its surface, or in the same plane as the mirror itself, or so indefinitely localised as to make their apparent position beyond the mirror very uncertain. This is especially the case with objects or images reflected from plane glass behind which is a paper or picture. But if the head is moved from one side to the other, keeping one eye closed, the parallax of motion at once makes the image appear very distinctly located beyond the glass. There is no confusion as to its general position. I have found also that the shadows of the limbs of trees, irregularly shaken by the wind, often present the appearance of perspective caused by the parallax of motion. I discovered this accidentally in a very distinct case of shadows caused by electric lights, and have corroborated it by frequent experiments. Still I am not disposed to attach much weight to it, unless it can be confirmed by general experience, because it often fails and those cases in which it was successful may possibly have been illusions. They were, however, suggestive of possibilities, and even the very illusions may attest the influence of inference in such cases.

The illusions produced by a cyclorama are very interesting phenomena in this connexion. In moving from place to place before the picture, it is quite a common experience to feel a slight dizziness or vertigo. I have overheard this feeling remarked by persons who did not know the causes of it, which are found in the fact that their motion disturbs the relation between visual adjustment and the apparent perspective of the picture. But I have also noticed that any motion toward the picture is invariably accompanied by its apparent and rapid approach toward me, until I become stationary again, when the illusory perspective or distance is immediately restored. While approaching it, the picture seems near, or much nearer than when standing still, although in the case to which I am referring the spectator cannot get nearer to it than forty feet nor further from it than fifty feet, and standing at either distance does not affect the illusion: the perspective seems as great in one position as in the other. It is only when in motion that any distinct consciousness of nearness or approach is effected: and this of

course is due to the changes of adjustment, local and convergent, although these are very slight for those distances. But the incident which is mainly relevant to our purpose is the fact of illusion, which investigators have not failed to explain by showing that it is due to a false interpretation of visual signs under circumstances which, if the third dimension were a direct and reflex construction from the states of optical adjustment, would not permit the occurrence of illusion. The argument could not be stated more forcibly for the presence of inferences in the process, and Helmholtz enumerates multiplied instances where judgment interprets what cannot be directly seen: for example, illusions of magnitude and distance, aerial perspective, subjective or entoptical phenomena, inversion of mathematical perspective, interruption of contour by one object partly covering another, &c. These all point in the same direction, and although, as I have said, he mentions the parallax of motion he does not make much use of the phenomenon, but concentrates his chief attention upon the apparent motion of objects toward each other as we recede from them, and apart from each other as we approach them. All these make out a very strong case for the theory of inferences, more or less recognised since the time of Berkeley, and fortified as it has been by accumulated instances. Whether they support any doctrine of "unconscious inferences" may be another question, unless, as indicated, the term "unconscious" be taken in the loose sense to denote a readiness which is not apparent in deliberative inferences where hesitation occurs.

III.

Let us turn to a criticism of the theory. Undoubtedly the phenomena described, and those to which Helmholtz appeals, prove the presence of interpreting and inferential functions: for it is, perhaps, impossible to exclude the accompaniment and co-operation of such agencies from any or all forms of experience. But it is the mistake of Helmholtz and advocates of his theory, or of that of Berkeley, that they actually or by implication deny the existence of any other factors and influences in the process. They make the process wholly one of inference from data not containing space. So far as they are thinking of the relation between tactual and visual phenomena, they are right; but they forget that what is true of the synthetic connexion between two or more senses is not necessarily true of individual senses, and that, so far from being the sole cause in the result, in-

ference may be but one of co-operating causes, or one cause acting beyond the limitations of others. For instance, it is conceivable that within certain distances the monocular and binocular perception of the third dimension is determined directly by visual functions, say of adjustment; but that, beyond the point where changes of adjustment do not occur or are too slight to be observed, aerial perspective, shades of distinctness, differences of retinal magnitude in conjunction with these, &c., may be the basis of inferences which either supplant or assist other functions. This supposition is only to show that the two functions are not mutually exclusive, but may be mutually co-operative. Inference is present in many cases; but, if we observe closely such incidents as the interruption of contour referred to and *inferred* parallax, we shall discover that the conception of space that is inferred from them is either one of tactual and motor sensations, where we imagine the kind of motion required to bring ourselves into contact with the supposed farther object, or it is one representing the way it would appear to vision where the ordinary visual functions could construct a conception of their own. This merely shows that the inference is either limited to interpreting the relation or identity between tactual and visual percepts, or is only a co-operating factor in vision. In the latter case, no contradiction exists between the theory of inference and that of intuition; and, as those who support the theory of inferences do not take sufficient account of the possibility that vision may have its own space or extension immediately seen, but not immediately adjusted to the space of touch, they have extended to vision what is proven only for the relation between sight and touch. In binocular combination of stereoscopic figures, as my former article showed, there is a visual *quale* which is different from the conception of a plane surface. This differential quality may as well be called the third dimension of vision. It is directly seen, and not found by inference, although its meaning for tactual sensations and muscular experience is inferred by association. The same may be true of many instances to which Helmholtz appeals for support to his theory. The inferences of which he feels assured may be limited to the interpretation of the relation between the two percepts or concepts; and, until he shows that no other process is admissible in the individual senses, his verdict for them, implied or asserted from the connexion between touch and sight, must be considered as not proven. Berkeley, by a slip of the tongue, admitted the existence of "visible exten-

sion," but did not see that this compromised his theory of inference in all except its interpretation of the connexion between the two senses of touch and sight. Helmholtz, like Berkeley, seems to argue with the notion of *externality* before his mind, and conceived in reference to tactual and motor experience, but forgetful that space, apart from bodily externality, may also be represented by plane dimension, as an undoubted visual percept of coexistent points, supplemented by a differential quality which, being immediately perceived as magnitude, indicates coexistences external to, or different from those of plane dimension, and so constituting visual extension of the third dimension. What he proves of the association of this *quale* with externality as tactually conceived cannot be transferred on its own merits to the visual *quale* itself which may be called a space or extension *sui generis*. This is precisely the way in which the matter is regarded by those who consider that the true and clearest conception of space is that which is derived from vision, and that touch is adjusted to this by association rather than the reverse. The inducement to assign to touch the priority of experience and importance grows out of the undoubted priority of value which its freedom from illusion and the exposure of the organism to injury mainly through contact give it. But this does not exclude the view that the conception of space may be properly a visual one, requiring the superior constancy of touch to correct illusions growing out of the complexities of vision. Any theory which does not reckon with this fact is likely to commit a fallacy in its reasoning.

To make this position clear, we may recur to the fundamental principle which conditions the theory of Helmholtz: it is the denial of all pre-established harmony between the nature of impressions and the nature of the external world. If he did not deny this doctrine, it would remain possible to explain magnitude or plane dimension by the nature of the retinal image, and then resort to inference to account for solidity. But denying the doctrine, he is able to set up between impressions and objects just that kind of difference which exists between the datum and the object of an inference. It will be admitted, therefore, that he must make this denial if the doctrine of inferences is to be possible. But Helmholtz does not remark that a denial of pre-established harmony is as consistent with an *a priori* as with an inferential theory. It is true enough that a theory of inference cannot exist without this denial, but this theory is not necessitated by such a denial, or does not follow from it.

This he ought to have seen in the case of the sensations. He did not consider that colour or sound represented external reality, nor did he imagine from the denial of pre-established harmony between them and the nature of their causes that the sensations were inferences or products of experience. Hence his presupposition does not carry with it the proof, but is only the condition, of a theory of inferences. The evidence that any object of consciousness is the result of inference must be sought in other facts than the one, that the antithesis between sensations and the external world is such as to make it possible. If it were once supposed that space is a construction, as colour, sound, &c., are subjective affections of the mind or organism, the absence of a pre-established harmony would be assumed in this view; and yet it would not be possible to resort to inference regarding space in any instance except the synthetic connexion between the data of separate senses. This is the supposition which Kant made, and he agreed with Helmholtz regarding the antithesis between phenomena and noumena; but it was impossible for him in his view of the case to infer space beyond the data of perception, because it was itself the form of those data. Helmholtz is in a dilemma here. If he admit pre-established harmony, impressions would represent reality, and space would be an immediate perception, not an inference. If he deny pre-established harmony, space must either be a form of perception or a datum outside of all experience. Now, if it be the latter, an inference to it is impossible, *because an inference is from a certain fact not containing a given datum to another experience which does or did contain it*. Or, if it be a form of perception, while pre-established harmony is denied, much less could it be an inference in the last analysis, or the object of an inference, except in the associated percepts of two senses, where the inference is confined to the interpretation of certain signs in one sense as indicating a datum actually given in the other or previously known to consciousness. In all cases, therefore, it will be apparent that Helmholtz cannot carry his theory beyond the synthetic connexion of touch and sight. But this is not in advance of Berkeley, while the apriorist does not require to dispute such a conclusion. The position of the nativist is made good in the case of vision, if he can show that there are *qualia* which are distinct from colour-reflexes on the one hand and from tactual and muscular percepts on the other, and which may represent or constitute the dimensions of visual space as those of touch constitute tactual space; the two

sets being identified synthetically by any process we may choose to recognise.

An objection to the theory of Helmholtz can be produced from those very phenomena which he adduces in its support and which are generally admitted to agree with the doctrine of inference. They are the phenomena of mathematical perspective, and are illustrated by geometrical representations of solid bodies, such as cubes, parallelopipeds, cylinders, &c. The apparent perception of solidity in these cases has been explained by association and inference from mathematical resemblances in the visual image to that of solid bodies. The case is certainly consistent with the doctrine of inference in so far as we assume that the datum to which we infer is really not in either the object or the image as ordinarily understood. But this consistency alone does not prove the theory: especially as it is meant to pass from this case to the real one of solidity in actual bodies. It is most important to observe, however, that the explanation of such phenomena by inference is usually based upon the assumption that there is a pre-established harmony between the retinal image and plane dimension; so that either the absence of this condition in the case of the third dimension, or the illusory consciousness of solidity when it is known that the object has no third dimension and therefore has no representative in the impression, even if such were otherwise possible, is taken to imply that distance is an object of inference, knowing as we do that inferences give rise to illusions. That is, the theory of inferences is founded upon the supposition that there is an anomaly between the perception of magnitude or plane dimension and distance or the third dimension: and this anomaly consists in the representative character of the impression for one and not for the other. But since Helmholtz denies pre-established harmony *in toto*, he cannot avail himself of any supposed anomaly in such cases, because in his view plane and solid dimension are alike in this respect. And the criticism of his position is made all the stronger by the interesting fact exhibited in the inversion of mathematical perspective. For instance, the mathematical representation of a solid body may be seen in two different ways. A cube may appear in two different positions, and after a little practice the mind can pass from one appearance to the other at will. This is a familiar experiment and we need not describe it in detail. Helmholtz explains the phenomenon by inference, and regards it as explainable only by this view. But the manner in which the inversion can be made to take place at the instigation

of the will is decidedly against such a view. Not that the mind has no power to inhibit inferences, or to exercise a check upon its feeling of certitude in regard to them. But in the cases of mathematical perspective and its inversion there is a peculiar characteristic noticeable in consciousness at the time of the act, if carefully scrutinised, which is not like the correction of an illusory inference. It would be described by Wundt as a slight feeling of innervation, somewhat like that which is experienced in changing the point of fixation and attention from one side to the other of a small round spot. In the case of inversion of mathematical perspective there is, besides, the nascent attempt to realise the perception of motion, such as would take place in case a real object changed its position. That is, the mind expects to see but does not see the motion, and feels a kind of surprise at an evolution from one spacial relation to another without any alteration of outline or impression corresponding to it. Close examination of the visual process in the act of inversion will, therefore, show it to be very different from inference; although, in so far as the conception of tactual space-relations is involved in the total object of consciousness, inferential functions may well be admitted as accompaniments. In so far as the act is a visual one, it may be regarded, not as an inference, but as a construction of tridimensional relations which are not filled out by tactual elements of solidity; and hence the illusion is between the ideas of touch and sight, not between different objects of sight. The illusion or inversion is made easier in such cases by the absence of those real influences in actual objects which tend to give constancy and fixity to the perception,—a fact which rather favours the view that the perception of real solidity has an original element of reflex and psychical activity in vision instead of its being inferential. Hence inversion could easily take place in mathematical perspective because of the indifference of the impression to either of two possible constructions. That it is a visual perception and not an inference is still farther confirmed by the fact that the same mathematical lines would represent for inferences a large number of possible distances, requiring verification apart from sight to determine the true one; while the space-relations in visual construction and inversion have a constancy and are confined to limits which do not characterise inferences alone.

It is also possible to point out a difficulty in the argument from the parallax of motion. This supposed that the conception of the third dimension was inferred because, until the motion took place, real or apparent, the images seemed to

lie in the same plane. But, in the first place, this is not always the case, and even the apparent position in the same plane is or may often be an illusion, so that it is possible to consider this the inference, and not its natural localisation. Still more forcible is the fact that, if the consciousness of distance were solely inferential in such cases as I described, illusions ought to be frequent in regard to the perspective relation between the point of fixation and the apparently moving object when the head is moved from side to side: for, if the apparent motion is only that of images in the same plane, inference could assign to the moving image either of two positions in relation to the point of fixation, and be possibly correct. But I know of no illusion occurring here. When the fixation is upon the nearer object, there is no mistaking the greater distance of the other; and when it is upon the farther point, there is no illusion as to the nearer. This only indicates that there is a visual *quale* other than plane dimension in the visual consciousness, and may as well be called the third dimension for that sense, while it may be connected with touch by inference, and require experience to adjust it to tactual percepts.

Entoptical phenomena, as in the projection of phosphenes and the shadows of *muscae volitantes*, offer facts which can be used against the theory of inferences, although Helmholtz employs them to support his view. But to examine these carefully would require more space than I can venture to take at this stage of the discussion. There are incidents in them strongly suggestive of inference; and in their localisation with reference to each other in three dimensions, independently of their projection, connected with their different rates of motion or parallax, there are features which would readily give rise to inferences. But the localisation in these cases is so affected by the degree of focal adjustment or the object of fixation, that it is as easy to suppose the result to be one of visual construction as of inference, perhaps easier. In my own experience, I notice the same inversion of relative positions as takes place in the translocation of images, a phenomenon which we should expect in the perception of shadows: for they are analogous to mathematical figures in this respect. But the argument will not be pushed farther. It is enough to have found difficulties which require the modification of the theory of inferences.

In conclusion, it will be sufficient to remark that I am not desirous of limiting inferential processes in space-perception absolutely to the synthetic connexion of touch and

sight: for I think it even probable that they are complicated with the various phases and experiences of the individual senses. But I have desired to indicate the existence in vision of a *quale* distinct from differences of shade and colour, which may as well be called extension as not; because it is capable of being identified with a tactual *quale* of the same meaning, while the sensations proper are not so connected. If we limit visual phenomena as data to mere variations of kind and distinctness in colour, we cannot account for such cases as the appearance and inversion of mathematical perspective, binocular localisation and translocation, and the distinct effect of the monocular parallax of motion. These are qualities which are dimensional in their nature: not, perhaps, in the full synthetic scope of that term, but yet sufficiently so to deprive the theory of inferences of its empirical implications. That is all that I have desired to accomplish by my criticism. Since the qualification "unconscious," as applied to inference in Helmholtz's view, sets aside all the empirical associations attached to the accepted usage of the term "inference," I have not seen fit to consider it in the latter part of the discussion. If either the synthetic connexion of separate perceptions or the interpretation of certain signs in their meaning for other qualities in the experience of the same sense be "unconscious" processes, it is impossible to appreciate their supposed antagonism to nativism or their agreement with the opposite doctrine. Hence the conception may be dismissed from the problem. While the complexities of space-perception make the co-operation of inferential agencies very probable, yet the spacial quality must be originally given somewhere in consciousness either as an object of perception or as a mental construction, in order to furnish a basis for inferences to its existence or its relations where they are not immediately cognised. This makes the developed conceptions of abstract and synthetic space a complex of inferences and intuitions.

IV.—THE PRINCIPLE OF INDUCTION.

By L. T. HOBHOUSE.

IN MIND No. 58 I discussed the value of the Experimental Methods, and came to the conclusion that the Method of Difference supplies us with a type of valid inference from the particular to the general. But this conclusion raises a more general question. "On what principle," it may be asked, "can you ever generalise from a true particular?" Such a process must always take you beyond your premisses, whereas true reasoning must only elicit what is already implied in the premisses. And it may be said that the objection so raised is admitted rather than answered by Mill. It is true that he proposes the Law of Causation as the ultimate principle of Inductive argument; but, when we come farther to inquire into the grounds of this Law itself, we find that it rests on a form of generalisation which undoubtedly does involve a "leap" from known to unknown, and the very nature of which, on Mill's own showing, is to proceed on no fixed or definite principle at all.

On the view which I propose in this and in a following article, all inference involves a generalisation from observed particular cases. But definite principles may be laid down on which such generalisation proceeds. The nature of reasoning, then, consisting in the assertion or application of general truths upon these principles, such generalisation involves not a "leap" unwarranted by the premisses but a regular process from the known to the unknown. Such "advance" I take to be an essential part of the reasoning process.

In the present article I shall try to find the axiom on which inductive inferences proceed. In the following article I hope to discuss the principles of deductive inference and the relation between the two forms of reasoning.

- * The ultimate major premiss of Induction according to Mill is, we have seen, the Law of Causation. But this Law, as he treats it, is not so much a principle tacitly or openly implied wherever we draw inductive inferences, as a wide generalisation true of sequences just as other generalisations are true of the facts of space. Hence, further, it is itself an induction like other inductions. What we want on the

other hand is an axiom expressing in general terms what we do when we make a particular statement universal, which makes explicit the truth implied by the making of any generalisation whatever, and which thus, so to say, generalises generalisation. The Law of Causation will, I think, be found to be a particular application of this wider axiom, and the axiom itself must be sought from the analysis of ordinary simple generalisations.

Now, when I connect truths together, or reason, what do I do that I leave undone in judgment? I *support* my inferred judgment by some other assertion. If I say A will —B,¹ and am asked why I say so, I answer because A was —B. If I say the clear sunset this evening will be followed by a fine day to-morrow, I give some proof of my assertion when I adduce the clear sunset of yesterday and the fineness of to-day. Now, I may be answered by a doubter upon two lines. He may say A_1 and A_2 are not really alike. Yesterday's sunset was clear in sense of cloudless, to-day's in the sense that the air is transparent. Or we may say: Yes, A_1 and A_2 are alike, but there is something beyond these which makes the difference. With yesterday's sunset went (say) a certain electrical condition of the air, and it was that which really determined the fine day. That condition is not present now. This gives us roughly the two conditions of inference, which we have now to define further.

1. A_1 and A_2 must be alike. I use the notation $A_1 A_2$ to express that they are different facts, observed, that is, at different times or places, but that in character they are precisely similar. I say precisely, because it is only so far as they are similar that I have any basis for inference. It may be that I never get precise similarity, but I do find *points* of precise similarity, and it is from these that I argue. The terms I use in describing a fact always allow a certain latitude. I call many different shades of colour red. But the more latitude is allowed, the more difficult it is to argue with precision. If I can argue at all from one red to another, it must be because just in point of redness there is no difference between them; they are both equally red; in that point they are precisely similar. Argument, then, is precise in proportion as similarity is precise.

We may, if we like, use the word "same" to express this precise similarity. But if we do, we must observe that we intend by it something quite different from the sameness of

¹ I use the symbol — to express any sort of relation between two terms.

an individual with itself. I am the same man that I was five years ago, in one sense of the word ; that is, there is a *continuity* in my existence. I am not the same man as I was then in the sense of being precisely similar, for propositions true of me then are no longer true of me now. I cannot infer at once from a past attribute of myself to a present one. On the other hand, the blue which I see in the picture is the same tint that I see in the sky. They are, in point of mere colour, precisely similar. They are not continuous, and one might disappear and leave the other. But what is true of the one colour as such is true of the other.

It may be asked how I can reason from one thing to another when they are not the same? That is precisely what I wish to show. I take this "advance" to be essential to real inference, and my present aim is to prove that it is made upon a single definite principle.

2. But though A_1 and A_2 are precisely similar, there may be some change in the concomitants of A, outside A. This change, again, may or may not affect B. When I infer A_2-B_2 then, I assume either that there is no such change, or that no change outside A makes any difference to B. We will consider presently what we mean by "making a difference".

3. Observe now the implication of inference. If I do argue from A_1-B_1 to A_2-B_2 I imply that $A-B$ holds always ; that given an A we shall always have a B in the same relation to it. This, of course, is the point always brought out by cross-examination:—"You think *laissez-faire* best in this case—do you think it *always* the best thing?" The implication is that, if not, you must be prepared to adduce that circumstance in the case which makes *laissez-faire* the true policy here ; and this circumstance must be one which always makes it the best policy, unless, again, to take a further complication, there are special circumstances which always make in the opposite direction. Without pursuing such complication further, we see that in arguing from A_1-B_1 to A_2-B_2 we commit ourselves to the assertion A always $-B$, or Any A $-B$.

And we can, in fact, always argue from A_1-B_1 to A_2-B_2 unless there is some change in the concomitant parts which makes a difference. This formula holds of any sort of inference, from the barest analogy upwards ; only, in the case of a mere analogy we have really no sort of ground for supposing that there will not be some change which "makes a difference". If I argue:—"X sat down thirteenth at table

and died within the year ; you have done the same ; therefore you will die,"—I pay no attention whatever to the concomitant facts. X may have been in a consumption. The consumption then is the fact that makes the difference. It was the consumption which produced X's death, and having assigned that as the cause, and discovered that it is not present here, I have no ground for the conclusion. But it remains that there must be some such fact discoverable ; or otherwise the inference from A to B will hold universally. The fact in question may be something of which A is really a part, or it may be something quite separable from A, or it may be the absence of counteracting causes, or, to phrase it differently, the presence of conditions which are neutral to the effect. We will go further into these cases presently. Meanwhile we must observe that the phrase "makes a difference" requires further analysis. Such an expression involves some activity or causative power. This is really a specific conception, and we want one that is general. What we really mean when we say there must be some change which makes the difference, is that there must have been some fact which is always connected with the consequent, and which is not present now ; in other words, if A is not always in the relation which we observed between it and B, then there was along with A some third fact C, which does always go with B but not always with A. As I said above, this third fact may bear any sort of relation to A : it need not be entirely separate from A, but involves more than A pure and simple. We now see that, whether we accept or reject an inference, we make the same assumption of the universality of relations and no other. In the one case we assume A—B universal, in the other some C—B.

There are then two conditions of inference : (1) that A and A₁ should be alike, and (2) that there should be no third C, other than A and the universal correlates of A, which is always in a definite relation to B. And there is a single implication in inference, namely, that the relation we are now asserting holds always. We thus see that the conditions of inference and the implication of inference rest all on one principle. *B must have some fact with which it is always in relation.* That fact may be A, and if so we can infer from A to B ; but it may be C, in which case we cannot infer from A to B. It may be that A which struck us in connexion with B is the fact always related to B. If not, it is some other fact. There always is some such fact to be found. Thus in inferring to A₂—B₂ I imply A always —B ; and that again

implies that there is no C always —B which is not itself always related to A.

That we should be able to reason at all, then, involves that any fact, as B, should have some other fact, as C, to which it is always related. By this is meant that any fact precisely resembling this B, whatever its other attributes and concomitants may be, will be found in a precisely similar relation to a precisely similar C. It does not involve that any A to which B happens to be related here should be always related to B. And hence the proposition which is to hold good of any two facts whatever, that are observed in any relation, must present us with an alternative. Either the relation observed holds always, or there is some other fact present in the observed case always related with one of our two facts and not with the other. Now, when we draw an inference, it is implied that the relation asserted holds always, and we see that this implies the absence of any such other fact. Hence we may put the axiom of Reasoning thus :—

If a fact A_1 is observed in any relation to a fact B_1 , then any A will be in that relation to B, unless among the facts in relation to the B observed there was some fact other than A alone which is always in that relation to B in which it stood in the observed case but does not always stand in the relation to A in which it then stood.

I have here put the axiom as if A were the fact presented to us in some second case. But obviously the order makes no difference. If it were B that were presented to us we could say just the same of A.

My object in putting the axiom thus is to phrase it so that it may hold of any sort of fact, and by "fact" I mean anything that strikes our attention, and that we speak of as a fact, whether we bring it into a unity naturally or artificially. However much or however little of the "work of the mind" there may be in it, whether it be a substance, or a well-defined attribute, or the first rough apprehension of an attribute, or a statement involving a complicated system of parts, I understand this judgment to hold true of it. The word "relation" also needs a little explanation. As I use it here, I mean to assert it not only of a fact that is before or after another, or near or far from another, or like or unlike another, but also of a fact which is an attribute of another which is its substance, or which is conjoined with another as a second attribute of the same substance, or as a second aspect of a complex mass of facts. I hold a relation to exist between two facts whenever the mind can at once

distinguish the facts as two, and at the same time attend to them together and assert something of them considered together.

To illustrate my meaning, let the observed relation be exposure to cold followed by inflammation on the lungs. Here A is exposure to cold. Now I am quite aware that such a fact as this cannot exist in isolation. It was of course a particular concrete case of the exposure to cold of a particular person. Quite so; but *all we may know of it* may be quite adequately represented by the bare words "exposure of a man to cold". Of course the more I know of it the better for my powers of drawing inferences, but as soon as I begin to know such a bare fact as those words express I begin to have some basis for reasoning. The same remarks apply to the term B. Hence without knowing anything more of A and B than is expressed by such words as are used above, and the fact that B did follow A, I can say that in this case again, or in any case, B will follow unless in the first case B was related to some third, C. Now this third, C, might be something quite apart from A: it might be, for instance, the continual inhaling of iron dust; or again, it might involve A and something more, *e.g.*, it might be exposure to cold following great heat and in an exhausted condition on the part of a man with weak lungs. To get at the whole fact which would really and strictly be *always* followed by inflammation of the lungs, we should doubtless have to go through something very complex. But in the broad sense I have given to the word "fact," with the object of abbreviating the formula, it would hold that *some* fact could be found always related to the fact inquired about.

Let us take another case: a pistol-shot, A, caused death, B. Now a pistol-shot might not cause death. What does cause death? Let us say a projectile aimed in one or other of certain definite directions and with not less than a certain energy. If I shoot a man and aim straight at his brain or his heart and am near enough for the ball to penetrate, I shall kill him. Thus I can find a fact standing in universal relation to my B. But it is not something out of all relation to A. A, the pistol-shot, is a vague phrase expressing one aspect of the whole fact—the aspect which would first strike a bystander. The C which is really connected with B involves A and something more. The whole fact can be analysed of course into any number of "latent processes," and again has any number of aspects. Now A is just that

aspect which happens to have struck us. C is here some fuller account of the whole fact.

Again, "This oxygen has an atomic weight of nearly 16. Any oxygen will have the same." The assumption here is that there is no further fact to be taken into account. It is merely as oxygen that the substance has the assigned atomic weight. There is nothing that can make a difference, and the relation must always hold. And this illustrates the way in which I wish the term "relation" to be understood in the formula above given. I speak of a *relation* existing between oxygen and its atomic weight. Of course I do not mean that they are in any way separate existences, but they are different aspects of the same existing thing, and may come before us at different times. We may thus speak of a relation of coherence between them, knowing at the same time that such a coherence constitutes the whole thing a unity.

In a purely frivolous or false inference, the C which is really in relation to B is something quite foreign to A. If, to take Grote's instance, I assert that on the day of the battle of Salamis rain fell on the site of New York, and if I were to go further and say that therefore if another battle were fought at Salamis rain would again fall on that site, the obvious answer is that the rain depended on meteorological conditions quite foreign to the political causes which led up to Salamis, *i.e.*, there is a third C totally disconnected with A. If, again, because the battle of Himera was fought on the same day as Salamis or at least about the same time, I were to expect a similar conjunction to repeat itself, I should be very far out, though not quite so far as before. For the conjunction of Himera and Salamis may have been remotely due to some correspondence between Persia and Carthage. The cause of Himera, then, was remote from that of Salamis, but not, so to say, infinitely remote. I should have to insert a great number of links connecting my A and my C before I could infer universally. I should have to observe the repetition of a great number of military and political conditions.

If we now develop our axiom for a while, we shall see that certain broad cases of its application may be distinguished, and we may with advantage restate it in view of them. The first and most important distinction is between cases where the third fact C, the fact that is always accompanied by B, is a fact which includes A or is closely related to A, and those in which it is not. The first case will give us good ground for inference as a general rule,

though it will not give absolute certainty. The second allows us no ground for inference at all.

The first case would be represented in the instance above given by the man who caught inflammation from exposure under special circumstances; the second, by the man who was indeed exposed to cold but in fact caught his illness from inhaling iron dust. A still better instance of the first case is afforded by mechanical pressure. Let a force P act on a body at A in the direction AB ; we may infer that the body will begin to move in the direction AB unless there are some other forces acting on it in the contrary direction. In other words, the case of inference which we are now considering is that in which counteracting causes are possible; in which we have one or more main determinants of the fact B , but the whole complex of conditions is not given us. Restating the axiom from this point of view, we get a double distinction.

If A_1-B_1 , then

Either any $A-B$, as *e.g.*, A_2-B_2 ,

Or with A was some third C which always $-B$,

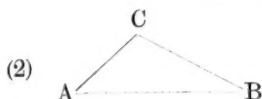
Or with A_2 will be some third D which always —
absence of B .

Before showing how the axiom in this form can be brought into relation with the Inductive Methods, I want to meet in advance a criticism which might be passed upon it as here given. It may be said my symbol ($-$) is so vague that it would comprehend any relation in the universe; or, if for it I substitute "coexists with or is followed by," that I am not much better off unless I specify the limits of space or time within which the coexistence or sequence must take place if it is to affect our inference. In other words, such an expression as "in the case observed there was a third fact C " is either so vague as to be of no service, or else implies that I have already isolated a certain group of facts from the surrounding universe and know that I need not consider the rest. To escape from this dilemma, it is, I think, only necessary to state the axiom with greater accuracy, if also more clumsily:—

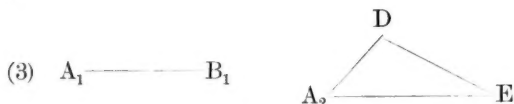
If a fact A_1 is observed in any relation to another fact B_1 , then either any other A_2 will be in the same relation to B_2 ; or with A_1 and B_1 was a third fact C which always stands in the relation to a B in which it there stood; or in relation to A_2 there is a third fact D which in such a relation to A is always so related to a fact E , unlike B , that E will occupy a relation to A_2 similar to that occupied by B_1 to A_1 in the case observed.

To illustrate this complicated statement, let us use a graphic method representing a relation now by a straight line of definite length and direction. We have :—

$$(1) \quad A_1 \text{-----} B_1, A_2 \text{-----} B_2$$



Here the relation C—B holds always, but we know nothing of A—C. Therefore, given A again, we have no reason to infer B.

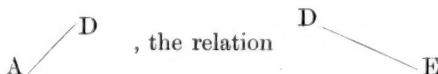


Here we should have A-----B if it were not for D, but

D

E

is a relation which *always* holds, hence, if we have the relation



will bring E into the precise place previously occupied by B. For instance, supposing A is a force acting on a body in a given direction, and B is the resulting movement when A acts alone, then D would be an equal and opposite force. Now if D does not act on the same body at the same time it will not, of course, counteract A ; but if it does so act the result will be equilibrium, E, instead of the movement B. Then to secure true counteraction of B, D must be in a definite relation to A : it must act at the same moment on the same body.

I have, I think, said enough to show that the three alternatives afforded by the Axiom as thus stated correspond to the three cases in which A is the "sum of the conditions of B," or in any way a universal correlate of B ; in which it is the cause of B in the popular sense of the term ; and in which its connexion with B is merely "casual". In other

words, the Law of Causation is the Axiom of Reasoning as applied to the sequences of phenomena.

I have not space to exhibit the connexion of the Axiom with many forms of reasoning, but I wish to show its application to one form in particular—the Method of Difference.

How does the Axiom help us in dealing with the Method of Difference? In a very simple way; the method proves that there is no third C universally related to B. We have, under a rigid application of the method,

Acdecde.
Bfghfgh.

Now this proves that none of the concomitants of A (*viz.*, *cde*) are universally related to B. In other words, we have a case in which A is followed by B without the presence of any third C, which is always related to B. Hence A will always be followed by B unless we have counteracting causes. The Method of Difference, then, is simply a particular application of our Axiom.

But we have to remember Mr. Bradley's exposition of the defects of the Method. It might be that, though *cde* would not produce B without A, A in its turn would not produce B without them, or some of them. Then it would be true that there would be no third C altogether apart from A which would produce B, and yet not true that A would always produce B. To save our Axiom, we should have to regard the absence of *cde* as a counteracting cause. But this would generally be very far-fetched, and an unfruitful way of looking at it. Let us then modify the second alternative of our axiom, thus:—

Either A will always be in that relation to B, or there is a third C which either is always in the relation which it here holds to B, or whenever it is in the relation which it here holds to A is in the relation which it here holds to B.

This statement gives us the distinction popularly drawn—and, like most popular distinctions, resting on a fundamental truth—between cause and condition. The first subdivision of my second alternative makes C the cause of B, and leaves A nothing to do with it. It is this which is eliminated by a single application of the Method of Difference. The second subdivision leaves it open for C to be a joint condition of B, together with A. If C is not really such, that may be proved by repeated applications of the Method. Thus, summing up, one good instance under the Method proves that A is followed by B without being accompanied by any third fact

which is always followed by B, whether or not A is present. Repeated instances may prove that A is followed by B, whether or not any other conditions are present.

I can argue then from any fact of observation, provided that fact gives me in some way or other the means of sifting it. But I can do this, because any and every fact observed stands in universal relation to some other fact. I start from particulars, and I reason about them, but the reasoning itself is the assertion of a universal. It is the judgment that certain facts are always in such and such a relation. This judgment is implied in the rudimentary inference which states only the particular fact observed and the particular fact now expected. It is explicit in the reason that is conscious of its own grounds and methods, and takes there the form of the universal judgment, or major premiss.

I may be asked, "How can we ever outside mathematics attain to propositions so rigidly universal? There is always a chance that we may be deceived." There is. And to go into the whole question of Chance, and the relation of its assumptions to the assumption of reason, is out of my power here. At present, I can only repeat what I have said before of chance—that, though, in fact, chance does interfere with our reasoning, still reasoning can and does go on, and I am concerned here with the implications of reasoning alone. The "simple enumerations" on which most of our "judgments of allness" depend rest, of course, on the Law of Chances. They are to be accepted so far as the instances taken have been diverse, numerous, and "random" enough to eliminate chance. In fact the statement of allness according to our Axiom would mean primarily that we had reason to believe that there was no third factor in the instances observed that was responsible for the relation found in them. The assumption of a Simple Enumeration is that we have observed A and B together so many times that the chances are against the combination being casual—that is, due to some third C. The repetition of the instance guarding us more or less (according to the nature of the instances) against this, we are enabled to draw an inference.

Leaving, for the present, the question of chance, I must say a word in conclusion on the question of the proof of our Axiom. Mill held that the Law of Causation could be proved by a simple enumeration. Now, his law of causation is the axiom of reasoning as applied to sequence. Let us then

apply his proof to our axiom. The axiom holds good in cases *a, b, c, d . . .*, therefore it holds good in all cases. Therefore? Why? Because that which holds good in many cases will hold good in all. But that is precisely what our axiom asserts. Our axiom is, that what holds once will hold always, unless something makes a difference. We have then used our axiom as major and conclusion in the same syllogism.

If there is any axiom involved in reasoning it can never be proved by reasoning. The only kind of test of which it is susceptible is the test of self-consistency in all its applications. If we could find a case in which it could be proved not to hold, it is true that we should be using the axiom itself to prove its own nullity, but still we should be bringing ourselves by that very fact to an inconsistency, and should be certain that somehow we had got wrong. On the other hand, so far as we find it applying and "coming out right," we get a certain test of its truth. And this should be carefully noticed, that it is one thing to speak of proving the Axiom of Induction, and another to show that a particular formula is that axiom. There we are liable to mistake, and therefore we not only can but must attempt to prove. We cannot set up dogmas of our own and say these are the axioms of reasoning, and therefore above proof. We must prove that they are in fact the statement of that which is implied in reasoning. I have tried to do this by the analysis of some simple inferences, and my main conclusion is that a definite principle can be laid down on which we form our generalisations from the particular cases that we observe.

V.—THE UNDYING GERM-PLASM AND THE IMMORTAL SOUL.

By Dr. R. VON LENDENFELD.

[The following article appeared originally, last year, in the German scientific monthly, *Humboldt*. It is reproduced here (by permission)—the English from the hand of Mr. A. E. Shipley—as a specimen of the kind of general speculation to which modern biology is giving rise.—EDITOR.]

To Weismann is due the credit of transforming those vague ideas on the immortality of the germ-plasma, which have been for some time in the minds of many scientific men, myself amongst the number, into a clear and sharply defined theory, against the accuracy of which no doubt can be raised either from the theoretical or from the empirical stand-point. This theory, defined as it is by Weismann, has but recently come before us, and some time must elapse before all the consequences which it entails will be evident. But there is one direction which I have for some time followed, and indeed began to think out long before Weismann's remarkable work showed the importance of this matter. I mean the origin of the conception of the immortal soul.

Before I approach the solution of this problem, it may be advisable to recall in a few words to my readers the theory of the immortality of the germ-plasm.

All unicellular beings, such as the Protozoa and the simpler Algæ, Fungi, &c., reproduce themselves by means of simple fission. The mother-organism may split into two similar halves, as the *Amœba* does, or, as is more common in the lowest unicellular plants, it may divide into a great number of small spores. In these processes it often happens that the whole body of the mother, the entire cell, may resolve itself into two or more children; at times, however, a small portion of the mother-cell remains unused. This remnant, in the spore-forming unicellular plants represented by the cell-wall, is then naturally dead.

From this it follows that these unicellular beings are immortal. The mother-cell divides, the daughter-cells resulting from the first division, repeat the process, the third generation does the same, and so on. At each division the mother-cell renews its youth and multiplies, without ever dying.

External circumstances can, of course, at any moment bring about the death of these unicellular organisms, and in reality almost every series of beings which originate from one another in this way, is interrupted by death. Some, however, persist. From the first appearance of living organisms on our planet till to-day,

several such series—at the very least certainly one—have persisted.

The immortality of unicellular beings is not at any time absolute, but only potential. Weismann has recently directed attention to this point. External occurrences may at any moment cause the death of an individual, and in this way interrupt the immortal series; but in the intimate organisation of the living plasma, there exist no seeds of death. The plasma is itself immortal and will in fact live for ever, provided only external circumstances are favourable.

Death is always said to be inherent in the nature of protoplasm. This is not so. The plasma, as such, is immortal.

But a further complication of great importance affects the reproduction and the rejuvenescence of these unicellular organisms; this is the process of conjugation. Two separate cells, distinct individuals, fuse together. Their protoplasmic bodies not only unite but intermingle, and their nuclei do likewise; from two individuals one results. A single cell is thus produced, and this divides. As a rule, this cell seems stronger than the single individual before the union. The offspring of a double individual, originated in this way, increase for some time parthenogenetically by simple fission without conjugation, until at length a second conjugation takes place amongst them. I cannot consider further the origin of this universally important process of conjugation. I will only suggest that a kind of conjugation may have existed from the very beginning and may have been determined by the original method of reproduction, if such existed.

At any rate conjugation has been observed in very many plants and animals, and is possibly universally present in the living world.

Conjugation does not affect the theory of Immortality. The double individual produced from the fusion of two individuals, which divides and lives on in its descendants, contains the substance of both. The conjugating cells have in no way died during the process of conjugation; they have only united.

If we examine a little more closely the history of such a "family" of unicellular beings from one period of conjugation to the next, we see that a great number of single individuals, that is, single cells, have proceeded from the double individual formed by conjugation. These may all continue to increase by splitting in two, and then the family-tree is composed of dichotomously branching lines; or they may resolve themselves into numerous spores, and then the family-tree exhibits a number of branches springing from the same point.

The majority of these branches end blindly with the death, caused by external circumstances, of that individual which corresponds with the branch. Only a few persist till the next period of conjugation, and then unite with other individuals and afford the opportunity for giving rise to a new family tree.

All the single individuals of such a genealogical table belong to one another, even though they be isolated. Amongst certain Infusoria and other Protista, they do, in fact, remain together and build up branching colonies. At the end of each branch is situated an Infusorian (Vorticella), and the whole colony represents in itself the genealogical family tree.

In the beginning, there existed no other animal organisms than these aggregations of similar unicellular beings, all of which reproduced themselves. Later on, division of labour made its appearance amongst the individuals of the animal colony, and it increased their dependence upon one another, so that their individuality was to a great extent lost, and they were no longer able to live independently of one another.

By the development of this process, multicellular Metazoa arose from the colonies of similar Protozoa, and at length culminated in the higher animals and man.

If we examine the human body, its origin and end, in the light of these facts, we shall see that a comparison between the simple immortal Protozoa and Man leads us to the result, that Man himself, or at least a part of him and that the most important, is immortal.

When we turn to the starting point of human development, we find an egg cell and a spermatozoon, which unite and whose nuclei intermingle. Thus a new cell is produced. This process is similar to the conjugation of two unicellular beings, such as two acinetiform Infusoria, one of which, the female (φ), is much larger than the other, the male (σ). This difference of size in the conjugating cell is however without importance.

From this double cell produced by conjugation many generations of cells arise by continual cell-division in divergent series. Amongst the Infusoria these are all immortal, but many of them are destroyed, and only a few persist till conjugation again takes place. The same is the case with man. Numerous series of cell-families arise, which are all immortal: of these but few—strictly speaking, only one—live till the next period of conjugation and then give the impulse which results in the formation of a new diverging series of cells. The difference between man and the infusorian is only that in the former the cells which originate from the double cell (the fertilised ovum) remain together and become differentiated one from another, whilst in the latter the cells are usually scattered but remain alike in appearance, &c.

The seeds of death do not lie, as Weismann appears to assume, in the differentiation of the cells of the higher animals. On the contrary, all the cell-series, not only those of the reproductive cells, are immortal. As a matter of fact all must die; not because they themselves contain the germs of death and have contained them from the beginning, but because the structure which is built up by them collectively, finally brings about the death of all. The living plasm in every cell is itself immortal. It is the higher

life of the collective organism which continually condemns countless cells to death. They die, not because they cannot continue to exist as such, but because conditions necessary for their preservation are no longer present.

Thus, whilst the cells are themselves immortal, the whole organism which they build up is mortal. The complex interdependence between the single cells, which, since they have adapted themselves to division of labour, has become necessary, carries with it, from the beginning, the seeds of death. The mutual dependence ceases to work, and the various cells are killed.

The death of the individual is a consequence of the defective precision in the working of the division of labour amongst the cells. This defect, after a longer or shorter time, causes the death of all the cells composing the body. Only those which quit the body retain their power of living.

Of all those countless cells which, in the course of a lifetime, are thrown off from the body, only one kind is adapted for existence outside the body, namely, the reproductive cells.

Amongst the lower animals the reproductive cells often leave the body of their parents only after the death of the latter. This is not the case in man.

All the cell-series which do not take part in the formation of reproductive cells, as well as all the reproductive cells without exception, or with only a few exceptions, die through unfavourable external conditions; just as all, or almost all, of the Infusoria which arose from the double cell, die before they can conjugate again.

At times, however, some of the Infusoria persist till the next period of conjugation, and in the same way, from time to time, some of the human reproductive cells succeed in conjugating, and from them a new individual arises.

A man is the outgrowth of the double cell produced from the conjugation of two human reproductive cells, and consists of all the cells which arise from this and remain in connexion with each other. The human individual originates at the moment of the mingling of the nuclei of the reproductive cells; and the details of this mingling determine his individual peculiarities.

The end of man is manifestly to preserve, to nourish, and to protect the series of reproductive cells which are continually developing within him, to select a suitable mate and to care for the children which he produces. His whole structure is acquired by means of selection with this one object in view, the maintenance of the series of reproductive cells.

From this standpoint the individual loses his significance and becomes, so to speak, the slave of the reproductive cells. These are the important and essential and also the undying parts of the organism. Like unravelled threads whose branches separate and re-unite, the series of reproductive cells permeate the successive

generations of the human race. They continually give off other cell-series which branch out from this network of reproductive cells, and, after a longer or shorter course, come to an end. Twigs from these branches represent the human individuals, and anyone who considers the matter must recognise that, as was said above, apart from the preservation of the reproductive cell series the individuals are purposeless.

It is on this basis that the moral ordering of the world must place itself if it is to stand on any basis at all. It is an easy and a pleasant task to interpret the facts of history from this standpoint. Everything fits together and harmonises, and each turn in the historical development of civilisation when observed from this point of view acquires a simple and a clear causality.

I cannot enlarge on this topic, engaging as it is, but here a further question obtrudes itself. May there not be some connexion between the actual immortality of the germ-cells, the continuity of their series and the importance of the part they play, and the origin of the idea of an Immortal Soul? May not the former have given rise to the latter?

As a matter of fact, the series of reproductive cells possess the essential attributes of the human soul: they are the immortal living part of a man, which contain, in a latent form, his spiritual peculiarities. The immortality of the reproductive cells is only potential and is essentially different from that absolute eternal life which certain religions ascribe to the soul.

We must not, however, forget that at the time when the conception of a soul arose amongst men, owing to a defective knowledge of the laws of Logic, no clear distinction was made between a potential immortality and an absolute life without end.

Herbert Spencer has pointed out that all religions have their origin in reverence paid to ancestors. Each religion must have a true foundation, and the deification of our forefathers has this true and natural foundation inasmuch as they belong to the same series of reproductive cells as their descendants. Of course our barbaric ancestors who initiated the ancestor-worship had no idea of this motive for their religion, but that in no way disproves that this and this alone was the *causa efficiens* of the origin of such religions. It is indeed typical of a religion that it depends upon facts which are not discerned and which are not fully recognised.

With the origin and development of every religion the origin and development of the conception of the soul progresses step by step.

We find the justification of ancestor-worship in the immortality of the reproductive cells, and in the continuity of their series. This should also take a part in the origin of the conception of the soul.

Spencer derives the conception of the existence of the soul from dreams, and from the imagination of the mentally afflicted. The savage dreams he is hunting, and wakes up to find himself at home. In his dream he talks with friends who are not present where he sleeps; he may even in the course of his dream encounter the dead. From this he draws the conclusions—(1) that he himself has two persons, one hunting whilst the other sleeps; (2) that his acquaintances also have a double existence; and, from those cases in which he met with the dead, (3) that they are not only double persons, but that one of the persons is dead whilst the other continues to live.

Thus, according to Spencer, the idea arises that man consists of two separable thinking parts, and that one of these can survive the other.

When a person faints and recovers, we say he comes to himself. That is, a part of his person left him and has returned. But in this case, as in the dream, the body has not divided, so that in a swoon the outgoing portion is not corporeal.

The savage will think that this is what remains alive after death, for he is incapable of distinguishing between a swoon and death. Then he will associate the part which leaves the body during a swoon with that which gives life, and some will regard the heart, which fails to beat after death, and others the breath, which ceases when life does, as this life-giving part or soul.

Thus far I am quoting from Spencer.

The conception of the soul, which has thus arisen, has been utilised by astute priests to obtain power over their fellow-men; whilst the genuine founders of religions have made use of it, and by threats of punishment, and promises of reward, have tried to induce mankind to live uprightly.

With this purpose in view, the teachers of religion have changed the original conception of the soul and have added to it the attribute of absolute immortality and eternal duration, an attribute which is in no way connected by people in a low state of development with their conception of the soul.

At the present time amongst the religions of all civilised people the undying soul plays an extraordinarily important part.

I start from the position that no doctrine can receive a general acceptance amongst men which does not depend on a truth of nature. The various religions agree on one point, and this is the doctrine of the immortal soul. Such a point of universal agreement, I am convinced, cannot have been entirely derived from the air. It must have had some foundation in fact, and the question arises, What was this foundation? Dreams and phantasms, as Spencer believes? No, there must have been something real and genuine, and the path we have entered upon to find traces of this true foundation of the conception of the soul cannot be distrusted.

We must compare the conception of the soul as held by various

related religions, and strip off from it all those attributes which are not common to all. But those which all the various religions agree in ascribing to the soul, we may regard as its true attributes.

It would take too long to go into the details of this examination of the conception of the soul. As the general result of a comparison of the various views of the soul we may put down the following characteristics which are invariably ascribed to it :—

- (1) The soul is living.
- (2) It survives the body, and can continue to exist without it.
- (3) During life it is contained in the body, but leaves it after death.
- (4) The soul participates in the conduct of the body : after the death of the latter, causality (retribution) can still affect the soul.

The characteristics (1) to (3) hold also for the series of reproductive cells continually developing within the body ; and these attributes of the germ-cells may well be the true but unrecognised cause of the origin of those conceptions of the soul's character.

This like holds true for (4), although the connexion is not so obvious. For this reason, it will be advisable to consider the point in more detail.

It has been already indicated that the founders of religions have made use of the survival of the soul after death to endeavour to lead mankind to live righteously, by threats of punishments or promises of reward, which will affect the soul after the death of the body.

It is precisely on this point that in the most highly developed religions there is the greatest falling-off from the original conception of the after-effect of human conduct on the soul, and the most astounding things are inculcated by the Koran and other works, with respect to this.

But here again we may separate the true kernel from the artificial shell, and reach the conclusion that good conduct is advantageous for the soul after the death of the body, and that bad conduct is detrimental. In no other way can the Mohammedan paradise or the Christian hell be explained than as sheer anthropomorphic realisations of these facts, which can appeal even to the densest intellect.

What then is good conduct, or bad ?

The question is easily asked, but without reference to external circumstances impossible to answer. *Per se* there is no good or bad conduct. Under certain circumstances a vulgar, brutal murder may become a glorious and heroic act, a good deed in the truest sense of the word ; as, for example, in the case of Charlotte Corday. Nor must the view of one's fellow-creatures be accepted as a criterion of good or bad conduct, for different parties are apt to cherish diametrically opposed opinions on one

and the same subject. There remains then only one's own inner feeling or conscience. Good conduct awakes in this a feeling of pleasure, bad conduct a feeling of pain. And by this alone can we discriminate. Now let us further ask, what sort of conduct produces in our conscience pleasure, and what sort of conduct induces pain? If we investigate a great number of special cases, we shall recognise that conduct which proves advantageous to the individual, to the family, to the state, and finally to mankind, produces a good conscience, and that conduct which is injurious to the same series gives rise to a bad conscience. If a collision of interests arise, it is the degree of relationship which determines the influence of conduct on the conscience. As, for instance, amongst the clans in Scotland, a deed which is advantageous for the clan produces a good conscience, even if it be injurious to the state and to mankind.

The conscience is one of the mental faculties of man acquired by selection and rendered possible by the construction and development of the commonwealth of the state. Conscience urges us to live rightly, that is, to do those things which will help ourselves and our family, whereby our fellow creatures according to their degree of relationship may be benefited. These are good deeds, and they will merit from the teachers of religion much praise for the soul. We find, therefore, that the only possible definition of a good deed is one which will benefit the series of germ-cells arising from one individual, and further which will be of use to others with their own series of germ-cells, and that in proportion to the degree of connexion (relationship).

It is clear that in this point also the ordinary conception of the future fate of the soul agrees fundamentally with the result of observation on the prosperity of the series of germ-cells.

As all the forces of Nature, known to the ignorant barbarian only by their visible workings, call forth in him certain vague and, therefore, religious ideas, which are but a reflexion of these forces in an anthropomorphically distorted form, so the apparently enigmatical conception of the eternal soul is founded on the actual immortality and continuity of the germ-plasma.

VI.—CRITICAL NOTICES.

The Psychology of the Belief in Objective Existence. Part I. "Objectiva Capable of Presentation". By JULIUS PIKLER, Doctor of Political Science, Lecturer on Philosophy of Law in the Royal University of Budapest, &c. London: Williams & Norgate, 1890. Pp. 118.

Dr. Pikler's essay, mentioned in the last No. of *MIND*, p. 571, is a still more carefully reasoned piece of work than it seemed at first sight. Taken along with Mr. Stout's earlier-published but later-written article on "The Genesis of the Cognition of Physical Reality" in No. 57, it prompts to return upon a subject that had previous discussion here under title of "The Psychological Theory of Extension" (Nos. 51-3), but which at starting (No. 51, p. 418), might have been as well designated "The Psychological Theory of Sensible Object". This at all events, is the topic which I hope, before long, to take up again in *MIND* and to treat more adequately than in the two or three pages of general indication offered before. Dr. Pikler gives special occasion for such return, because nobody is so express and decided as he in maintaining a position which, so far as I can still see, is in the scientific point of view seriously mistaken. Thus, at p. 38, he declares that "our belief in the objective existence of matter or things arises only in consequence of our belief in the objective existence of space," which he makes the subject of prior psychological explanation. Apparently he attaches no importance, if he gave any attention, to the particular line of argument here advanced in a sense precisely opposite. That is a reason, added to one's failure to make serious impression upon the others (Mr. Ward and Prof. James), against whom at the time the argument was more especially pointed, for trying to restate it in more effective form. But, since the question is to be limited to Sensible Object (though that may turn out to involve a good deal more), it will simplify matters as regards Dr. Pikler, who must henceforth be considered among the foremost authorities on the whole subject, to give beforehand some account of the more general scope of his essay. Open, as I think, to exception both in principle and result, it is yet in more ways than one a very remarkable production.

It is, first of all, remarkable as written in English by a Hungarian hand. Whether his choice of language has been made from an opinion of the superior pliability of English to psychological uses or because the problem of the essay has so largely occupied the attention of English thinkers, Dr. Pikler's readers may thank him for it; nor does he suffer by the choice. Though his sentences are at times rather laboured or even awkward,

they do not fail at other times to be singularly pointed and effective; and, marked as his thought not seldom is by almost an excess of subtlety, it is really interesting to note how he always manages to make plain his meaning even to its finest shades. But, however it be with his means of expression, there is no question of Dr. Pikler's special indebtedness to the psychological work of the English school. This is manifest throughout from the very freedom with which he criticises its chief representatives. To J. S. Mill in particular, despite all difference, he stands in such close relation that his whole theory, so far as yet expounded, may be described as an effort to give full and satisfactory development to Mill's well-known doctrine in the *Examination of Hamilton*. And it is an effort that may be welcomed, as well as judged on the whole successful, even by those to whom the right solution of the object-problem does not seem attainable on Mill's lines.

What most distinguishes Dr. Pikler from Mill and the other English psychologists is the generality with which he conceives the problem. More careful than they to mark it off from the question of perception (to distinguish, *e.g.*, between the mere perceiving of space and the belief in its objectivity), he is still more decided on the point that the problem is not exhausted with an opposition of matter and mind. His own fundamental division of *objectiva* is into the two classes of—(1) capable, (2) incapable, of presentation; and each includes for him a large variety of particular cases. In the present volume, only the first class of objectives is covered; the question of belief in the existence of minds and other unrepresentables being left over for future handling. He maintains that the psychological problem of material object can be completely solved without reference of any kind to other consciousness than that of the individual subject. But, whereas Mill, with whom he shares that opinion, took up, at the prior stage, only the question of the external world, Dr. Pikler finds this to be but one of a number of equally presentable objectives, and by no means the first of them to call for scientific regard. Not only, as already mentioned, does he put the question of space (and time) before matter, but, prior to time and space as objects, he holds that we may become conscious of objective attributes pertaining to our bare (subjective) presentations; and he charges it against all previous psychologists that they have overlooked this true beginning of a science of object. It is not surprising, then, that, working up from such a depth, he should not stop short with the material things of sense, but should bring within his theory of presentable object the "existence of cognitions (beliefs, memories, ideas)," and also such facts as that we can ascribe an "objective intensity" to presentations other than what we may be (subjectively) experiencing, or, again, that we may speak of mental states as actually or objectively present though "unconscious".

Nothing but praise is due for the care with which it is thus sought to muster together all the different classes of objectives agreeing in presentability. And, if the enumeration, as a whole, stands good, whether in Dr. Pikler's or in any other order, he must be allowed to have made a sensible advance in treatment of the object-problem with his fundamental distinction of presentables and unpresentables. It is less clear that he is right in thinking that this or that particular class of presentable objectives has been overlooked altogether by his predecessors. He asserts this especially of his first class—what he calls "attribute-presentations" or "objective attributes of our presentations". There are, in his view, eight of these altogether, as he thinks well—though his immediate task does not require it of him—to mention (p. 19): resemblance or difference, time-relation, local (space-) relation, duration, intensity, extension (*sic*), position, number. It cannot very seriously be maintained that these (or at least some of them) have not been recognised by psychologists as having a certain objective character abstracted from the (subjective) presentations to which they can be attributed. But it is of more interest to ask whether such objective character is so well and clearly marked as to be made, with Dr. Pikler, the prerogative instance of objective experience.

Dr. Pikler's reason for putting first this class of objectives is not expressly stated, but may be guessed with sufficient probability. The psychological problem of objectivity is, in spite of some rather ambiguous language at starting, rightly conceived by him as a question of how presentations, which are essentially facts of subjective experience, come to appear as having an existence (or subsistence) apart from the mind's perceiving. Now if (subjective) presentations, without ceasing to appear to be such, can be shown to have certain fixed attributes, whether intrinsically or in their relation to one another, that are not in the same way subjective as the presentations themselves, this fact would seem to be objectivity at the first remove, and to require, as well as admit of, explanation before any other part of the whole problem. But, should this be allowed, and the question as to space and body be then made to follow, one does not very well see why Dr. Pikler's later classes of objectives, which all have reference to phases of subjective consciousness, should not also be explained before the interpolated cases of "time and space" and "the external world". Can it however be allowed that the treatment of the whole problem should be so begun? Surely not. Be it as it may between space and body (of which more anon), it is not to be doubted that only after we have apprehension, somehow, of an external world is there any express consciousness of presentations or representations as facts of subjective experience, in which may then be remarked attributes or phases with a character of relative independence and fixity. The attempt, in short, by Dr. Pikler to work out a complete scheme of presentable objectives,

whatever its general merit, results in an ordering that can hardly be called other than highly artificial. It neither corresponds with the (historical) order of actual development in any consciousness; nor, by placing some of its later terms so far apart from the first, does it satisfy the requirements of an order of logical development. The two points of view—logical and historical—are, in fact, confused in Dr. Pikler's scheme. I take leave to say this, in spite of his careful distinction, at starting, between the *meaning* and the *genesis* of belief in objective existence. His treatment of "the genetic question" in one chapter at the end of the present essay understands this in a far too limited sense and is besides of a rather perfunctory character; while his remark quoted above from p. 38 shows him, in practice, not by any means careful enough to keep out an admixture of genetic considerations at the analytic stage.

A word now on Dr. Pikler's principle of explanation for all cases alike of presentable objective. Belief in such objective existence is, he holds, belief in one's ability to obtain this or that kind of presentation at will. Here may first be acknowledged, over again, the seriousness with which he conceives his psychological task. The essential meaning of objective—however afterwards aggrandised, in some cases, by reference to a common consciousness of different minds—may and should, he thinks, admit of being accounted for in terms of individual consciousness. Nor, in limiting his means of explanation to psychical fact or process of the most immediately personal kind, does Dr. Pikler at all minimise the problem. It is a true objective, independent of the individual's consciousness, which he is concerned to evolve from the consciousness of the individual. This is to take the psychological question seriously. And it need not be denied that a consistent meaning for presentable object may be found in Dr. Pikler's terms. Indeed, as he puts it, the assertion is little, if at all, more than an identical proposition. Whatever is by me *presentable* object in the world without, or whatever in the world within I may be ready to call *objective* because of its determinate possibility—*sc.* practicability—of presentation, is, in so many words, something that I can through act of will come to have a presentative experience of. If, on the other hand, the assertion be understood to have real import, it has hardly waited for Dr. Pikler to be made. Prof. Bain, for example, has told us (*Mental and Moral Science*, p. 199), as regards the external world, that "our object-experience consists of the uniform connexion of definite feelings with definite energies," and, in the wider reference to object in general, has given his well-known analysis of Belief under the head of Will. Obversely; it is cleverly urged by Dr. Pikler that the most distinctively 'subjective' of all experiences—our state of good or bad humour—is just that over which we have least voluntary control. It may be allowed, then, that there is no difficulty in putting such an interpretation upon

'presentable object' as Dr. Pikler seeks to carry through. But the question remains whether this is the primary and most natural interpretation—whether the notion of a 'possibility' of experience through will of mine is not secondary to the notion of a 'necessity' of experience which, in given circumstances, no will of mine can overcome. What says Dr. Pikler himself, at p. 71, when arguing that a man's "own world of memories and beliefs" is as truly objective for him as that external world which is common to him with others? "The particular parts of it are just as well defined, and exist *objectively as independently of our will*, as the particular things of the external world." The words I here italicise, falling so naturally from Dr. Pikler's pen, are in curious conflict with the theory he works out in the essay. And note, too, the bearing of the last clause of the sentence. "The particular things of the external world" are, for Dr. Pikler also, so much the type of what is truly objective that it lies to hand to remark that, by his own allowance here, the solution of the psychological problem of object should start therefrom. But, however much one may be concerned, on another occasion, to urge this point, it would be wrong to part from Dr. Pikler now and not repeat with emphasis that his treatise, as a whole, must henceforth be very carefully reckoned with by anybody who would essay the crowning question of psychology.

EDITOR.

The Croonian Lectures on Cerebral Localisation. Delivered before the Royal College of Physicians, June, 1890. By DAVID FERRIER, M.D., F.R.S., &c. London: Smith Elder & Co., 1890. Pp. v., 152.

In the last course of Croonian Lectures Prof. Ferrier brings under review and criticism the main facts of Cerebral Localisation. In the first edition of the *Functions of the Brain* he announced certain definite results, which in the second edition (1886) he developed somewhat and by repeated experiment sought to confirm; in the meanwhile he had discussed the growing details in the Gulstonian Lectures (1878), published under the title of *The Localisation of Cerebral Disease*. (See MIND ii. 92, iv. 137, xii. 132.) Now, in these Croonian Lectures, besides giving yet further facts and experiments, critically stated, he collates the results of recent research (by Horsley, Schäfer, Munk and others), and brings them to the elucidation of his own principal positions. It is important to have these periodical reviews from Prof. Ferrier, because long ago he committed himself to certain definite doctrines on fundamental topics: his argument always keeps close to his facts, experimental or clinical, and, if his hypotheses are not always unassailable, his method of presenting them gives material for independent judgment.

The first lecture presents the general facts of cerebral localisa-

tion in their historical setting. The sensory centres—visual, auditory, tactile, olfactory—are treated in four closely packed lectures; and the sixth and last lecture discusses again in the light of the latest experiments the theoretical problems, now familiar, of the motor areas, the relations of spinal and cerebral motor centres and the positive experimental knowledge of the frontal lobes. Prof. Ferrier presents nothing new in principle; his additions are chiefly to the evidence for his own view of the visual, auditory and tactile centres. The visual centre, which he takes as typical of sensory localisation in general, receives a very elaborate and careful handling. Each hemisphere is shown to be in relation with both eyes. "No doubt can therefore be entertained as to the binocular relations of each cerebral hemisphere in the owl" (p. 71). This too is consistent with total decussation of the optic tracts. Further, "the visual area is not a merely functionally differentiated region capable of replacing, or of being replaced by, other cortical regions, inasmuch as destruction of the visual centres leads to atrophy in the primary optic centres, optic tracts and optic nerves; and, conversely, destruction of the optic radiations leads to atrophy strictly confined to the regions included within the visual zone" (p. 72). This exclusive localisation of vision supports the hypothesis of special sensory localisation "in definite cortical regions".

For practical purposes Localisation, as Prof. Ferrier understands it, serves well, and every week brings facts to its verification; but, theoretically, there is something unsatisfactory in his sharp separation of sensory and motor. None of the ordinary methods of experiment quite warrants his very precise and dogmatic separation. Dr. Hughlings Jackson, to whose hypothesis of cortical representation Prof. Ferrier inclines, is always careful to note the compound, sensori-motor nature of the various levels; and, with the known complexity of the cortical laminations, this is a desirable caution. It may be that sensory centres are anatomically distinct from motor in the sense of occupying different convolutions; it may be that motor can be stimulated independently of sensory. Nevertheless, sensory and motor may fail to express a not less important fact, *viz.*, the relation between the assumed sensory and assumed motor. Prof. Ferrier's experiments undoubtedly demonstrate that the infinitely delicate and numerous channels for the passing of nerve-impulses in the brain do follow certain definite systems, do hold certain relations to peripheral organs, and are capable of control or stimulation at certain points on the cortical surface. But if anywhere, as is also assumed, the sensory systems are the regulating paths of stimuli to the motor systems, the all-important fact is not the sensory terminus or the motor terminus, but the sensori-motor connecting paths. It is allowed that motor cortical centres may discharge in response to stimuli from sensory centres, stimuli of sense-impression or revival of sense-impressions in the memory-centre: where, then, does

sensory end and motor begin? In such a case the organ in action, however its parts may be anatomically distinct, is really a compound organ—as much and as little sensory as motor.

The inadequacy of the bare division into sensory and motor is strikingly obvious in Prof. Ferrier's treatment of the "muscular sense"—a term now struggling for its existence. To take a marked case: when, in the absence of the "sense of movement," the eye guides, directs and controls the movements, how is the "control" actuated? Must we not assume some cortical connexion between visual and motor centres? In that case, the nervous organ is still sensori-motor, and it is arbitrary to limit consciousness to the mere sensory. If, on the other hand, we assume no intra-central connexion, we must regard the movements guided by the eye as the action of two centres in pre-established harmony. Here, as in many other cases, the division into mere sensory and mere motor breaks down. A more developed expression of the fact that I am trying to indicate was given by the Editor of *MIND* (in reference to Münsterberg's doctrine of Muscular Sense, in No. 60, p. 527) in the following words:—"But just as there never has been any hesitation in connecting some mode of presentative consciousness, under name of 'sensation,' with cortical excitation determined from the periphery, . . . so, when from within (*i.e.*, apart from direct 'sensory' stimulus) a process is started which results in muscular innervation at the periphery, it seems analogically justifiable to posit an element of presentative consciousness in the case—over and above anything in the way of representation not denied to be necessarily implicated".

Here the psychological view materially helps the physical. The same sort of inference is suggested from the physical side in the mere possibility of initiating by electrical stimulus any *acquired* movement. But, in a short notice like the present, I must forbear attempting to discuss the innumerable topics of psychological interest suggested by Prof. Ferrier's weighty lectures.

W. LESLIE MACKENZIE.

Pure Logic and other Minor Works. By W. STANLEY JEVONS, M.A. (Lond.) LL.D. (Edin.), F.R.S. Edited by ROBERT ADAMSON, M.A., LL.D., Professor of Logic at Owens College, Manchester and HARRIETT A. JEVONS, with a Preface by Prof. ADAMSON. London: Macmillan & Co., 1890. Pp. xxiii., 299.

The republication of Jevons's minor works on Logic will be welcome to the student: they occupy about two thirds of this volume. The remaining hundred pages contain the criticisms of Mill's Logic and Ethics that appeared in the *Contemporary Review* in 1877-8-9; and it is with these that the Editor's

Preface is chiefly concerned. The four papers published in the *Contemporary* were, the Preface tells us, but a trifling instalment of a great projected work on Mill's incoherences in all departments of philosophy. The labour bestowed upon this undertaking occupied a large part of the last ten or twelve years of his life, and resulted in the compilation of a "large mass of MS. material," little or nothing of which is in a fit state for publication. It is impossible not to regret for our own sakes that such an ingenious mind should have been so unprofitably employed all those years. But for Jevons it was certainly a labour of love, in prosecuting which he passed a happy time; his zeal and enthusiasm in the service being incessantly fed and inflamed anew by fresh imagined discoveries of contradiction and of well-meant ineptitude in the works of an author who was in fact our greatest public teacher since Bentham.

Prof. Adamson endeavours to explain Jevons's opposition to Mill as arising from a fundamental difference of opinion as to the character and scope of proof and certain knowledge. According to Jevons, proof and certainty were attainable only within the pure Logic of Quality, whereas he understood Mill to ascribe certainty to the results of inductive and material proof. Whatever the merits of this explanation of Jevons's mental attitude, it is but a poor defence of it, since it amounts to saying that Jevons began with a complete misconception of his opponent's position. But, considered merely as an explanation, it has the shortcoming of not agreeing with Jevons's own statement in his first *Contemporary* article, that he had at length been roused to action by a sense of the great public injury done to "the cause of philosophy and good intellectual training in England" by the general study of Mill's sophistical, false and illogical writings. This implies something more than a difference of opinion upon the value of Formal Logic.

Indeed Prof. Adamson's account of the great mass of MS. material for the complete criticism of Mill suggests a very different ground of dissent. Jevons's purpose was, he tells us to begin with Mill's *Essay on Religion*, and then to take up successively his views on Free Will and Necessity, Utilitarian Ethics, Inseparable Association and Logical Theory; and this order goes to confirm in my mind a belief long entertained upon evidence difficult to put into definite statements, that a distaste for Mill's attitude toward religion was at the bottom of Jevons's whole polemic. At the time these articles appeared in the *Contemporary* indeed, we cannot help remembering that other explanations of the matter—of a personal kind—were freely mooted. But such unlovely explanations are incompatible with the manner and style of these writings. The sincerity of Jevons's belief in the penetrating and destructive character of his own criticisms and his innocent delight in the play of his own vivacity, make it incredible that he worked under the stress of

any dark motive. Besides, meanly as he may think of Mill's intellect, he never doubts his integrity of character, but is always emphatic in attributing to him the utmost sincerity, candour and high-feeling. In this he is worth imitating. 'Alas, poor Mill,' he seems to say, 'such a good man and such a bad philosopher!' No: it is enough to say that he regarded himself partly as a scientific investigator who, in detecting Mill's "essential illogicality," had made a discovery hitherto hidden from the whole world; and partly as a chivalrous philanthropist rescuing mankind from oppression, a sort of Mr. Great-Heart heading the procession of our youths and virgins at the universities and marching to the demolition of Giant Despair and Doubting Castle.

In default of any considerable materials in publishable shape to be found amongst the posthumous MSS., Prof. Adamson gives us an outline of what he believes to have been the author's principal arguments and results. In these generalities there is not the slightest originality. If the work was to have had any value it must have lain in the details of execution; and if these may be judged of by the samples before us in the four published articles, it would be dishonest to express regret at the world's being the poorer by one big book unwritten.

When the four articles originally appeared, several replies were published in this Review. In No. 9 (Jan., 1878) the Editor offered some comments upon the treatment of Mill's doctrine of Geometry (*Contemporary*, Dec., 1877), at the same time deprecating the tone of that article, and pointing out the unsatisfactory nature of such criticism unsupported by any positive doctrine. In No. 10 (April, 1878) there were three notes upon the same subject. Mr. Arthur Strachey drew attention to a complete misconception on Jevons's part as to the course of Mill's argument upon the way in which imagination may supplement sense-perception in extending our experiential knowledge of space-relations. Jevons had mistaken for Mill's own opinion a passage in which he was really stating the case of a supposed objector.¹ Then came a reply by Jevons to the Editor's note in the Jan. No., followed by the Editor's rejoinder. In No. 11 Prof. Adamson took up Jevons's third paper on the Experimental Methods which had appeared in the *Contemporary* for April 1878, and completely exposed the critic's misunderstanding of Mill's doctrine as to the relation of those Methods to the Law of Causation. To this exposure I am not aware that any reply was ever offered.

¹ Oddly enough Mr. Strachey himself, in correcting Jevons, makes a precisely similar error. He says of Mill: "His theory being that we see a property of straight lines to be true by merely fancying ourselves to be looking at them, &c." But this Mill gives as an opponent's view. (*Logic*: bk. ii., c. 5, § 5, first parag.).

Meanwhile in the *Contemporary* for Jan., 1878, Jevons had published an article on Mill's doctrine of Resemblance, which seems never to have been noticed in *MIND*. The attack may be summarised as follows:—(1) In discussing the Import of Propositions (*Logic*, bk. i., c. 5), Mill mentions Resemblance as the last of the relations which a proposition may predicate. (2) In bk. iii., c. 24, he says that Resemblance (except as equality) is seldom the subject of science, and that Locke's doctrine of knowledge as only the perception of the agreement or disagreement of two ideas, and of reasoning, as nothing but the comparison of two ideas through the medium of a third, requires to be limited to the case of Resemblances. (3) In bk. iii., c. 8, however, it appeared that the Experimental Methods are wholly concerned with Resemblance, as their very names imply. (4) And in bk. ii., c. 3, it was shown that the universal type of the reasoning process was resolvable into the inference that certain individuals have a given attribute because other similar ones have that attribute: a doctrine repeated in discussing Analogy (bk. iii., c. 20). Finally, he says that the names of attributes are in their ultimate analyses names for the resemblances of our sensations (or other feelings) (bk. ii., c. 2, § 3 note), and yet holds that most propositions affirming the possession of attributes do not properly speaking assert Resemblance. What a delicious catena of contradictions! That ever their author should pose as a philosopher!

Who but must weep if such a man there be?

Who would not laugh if J. S. M. were he?

That in the passages above referred to Mill's language is always sufficiently explicit or sufficiently guarded, I do not maintain; nor even that the hidden source of the alleged confusion, namely the obscure delimitation of Logic and Psychology, is quite outside of his responsibility; but I venture to think that few intelligent students were perplexed by the above difficulties, and that Jevons's confusion is due to the characteristics of his own mind. He has, in fact, confused three things: (1) Resemblance as the ground of cognition, as in the doctrine that the names of attributes are names for the resemblances of our sensations; (2) Resemblance as the ground of inference, as in the explanation of induction, deduction and analogical reasoning; (3) Resemblance as the relation predicated in a proposition, that is, as a result of cognition or inference, or the 'subject of science'. The first of these belongs to Psychology only; the second belongs to Psychology if we are discussing the process of reasoning, to Logic (or Metaphysics) if we are discussing the grounds of proof; the third belongs strictly to Logic. Mill might have made these distinctions clearer; but they were implied in his exposition. We may all be said to have learnt them from him; and not to have perceived them argues on Jevons's part an unfortunate defect of intellectual sympathy.

It seems impossible to doubt that he had made a sincere attempt to understand his author. That he failed to do so may, perhaps, be attributed to his never having learnt to read—I mean, of course, to read like a critic and to interpret. This accomplishment was fortunately not much needed for the kind of work in which he was most successful—his investigations in Political Economy. But without it he should not have attempted this difficult piece of criticism, to disentangle Mill's "intricate sophistry," and to champion the human understanding against the "incubus" of his bad philosophy. How pathetically he complains of having had to study Mill for twenty years, and to lecture on him for fourteen years; how for ten years he had not found him out, and so on (p. 202): but part of the pathos lies in the fate of his pupils! To test his power of appreciating other men's ideas, turn to the end of the essay on Mill's *Utilitarianism*, where he declares his preference for Mr. Spencer's doctrines, and proceeds to tell us how he understands them.

This feeble power of interpretation becomes intelligible if we suppose that he had never been much accustomed to study the writings of the philosophers and metaphysicians, having perhaps no strong taste for such reading. And this again would explain how he seems to have supposed that imperfections of statement like these to be found in Mill were peculiar to him, as if they were not to be met with in an aggravated form in Locke and Kant (to name no others); so that the charge of "illogicality" founded upon such failures loses its terror in the comfort of such good company. It would also explain the conspicuous shortcoming of those criticisms—the absence of any definite philosophical theory to which the exposure of sophistry should have served as a foil. The critic had none; had never comprehensively reflected upon the subject; had perhaps been better employed. He, indeed, professes a general adhesion to the empirical philosophy; but, except his approving references to Mr. Spencer, the only further guide we have to the sort of philosophy he entertained is that Mill's was always the wrong sort.

Every sensible man respects Jevons and wishes well to his fame; and those who were most pained by these articles, by their noise of crowing, and by their queer suggestion that the critic not only thought Mill in error but was glad of it, would have been well pleased to forget all about it. Why were they not suffered to forget?

CARVETH READ.

Principles of Economics. By ALFRED MARSHALL, Professor of Political Economy in the University of Cambridge, &c.
Vol. I. London: Macmillan & Co., 1890. Pp. xxviii., 754.

Professor Marshall's comprehensive work, of which the first volume is now published, is likely to be the standard treatise on

Economics for a long time to come. It gathers up and utilises all that has been done by earlier and by contemporary writers in tracing the historical development of society, in amassing industrial statistics, and in defining and elaborating the theory of economics. Departments of investigation which have hitherto been confined to separate works, and even carried on by different and opposed schools of economists, are brought together in this volume, and made harmoniously subservient to the solution of a single problem—the explanation of present industrial forces. This alone marks it out as an important constructive effort. In the department of economic theory it shows a still more striking originality. Several of Professor Marshall's theoretical investigations have already been made known to economists. This volume shows how they point to a generalisation of economic theory which supplements the older doctrines and gives a new aspect to them. The theoretical inquiry is carried out on three parallel lines. In the text we have the precise statement and argument of each point and its illustration from industrial transactions. In the footnotes the graphical method is applied and each theorem represented by the aid of diagrams. The mathematical treatment of economic questions is used more sparingly, and is relegated to an appendix: for the author thinks that it is "doubtful whether any one spends his time well in reading lengthy translations of economic doctrines into mathematics, that have not been made by himself". In this way the argument in the text is complete in itself, and can be followed without reference to its diagrammatic or symbolical expression.

A detailed review of Professor Marshall's work would be out of place in a philosophical journal. It must suffice to have indicated its importance, and to mention one or two of its leading features, especially with reference to the relation into which economic principles are brought with philosophy.

The present treatise is described by the author as "an attempt to present a modern version of old doctrines with the aid of the new work, and with reference to the new problems, of our own age. . . . If the book has any special character of its own, that may perhaps be said to lie in the prominence which it gives to . . . applications of the Principle of Continuity." This is what gives it such a different aspect from the deductive political economy of a generation ago. From the outset this difference is apparent in the author's way of dealing with the definitions of economic terms—a department in which Professor Sidgwick's analysis has left little for any subsequent writer to do. The problem is: among a number of terms which are used in ordinary life and in trade, to give a definite and consistent meaning to each. And the difficulty of the problem arises from this, that the classes of facts denoted by these terms run into one another, and are in a state of constant growth. The recognition of this continuity, however, leads to a solution of the difficulty. But, through not recognising it, the older deductive economists were

apt to give fixed definitions, and then to ascribe the same fixity to the things defined.

Almost the only serious fault which Prof. Marshall would be inclined to admit in these economists—it is especially apparent in Ricardo—is that they tended to ascribe to human nature, and even to industrial methods, a constancy which they do not possess. For the rest, he defends his predecessors with unwearied loyalty, and interprets them generously. Yet the recognition of the continuous change in economic conditions involves a far-reaching difference between his method and theirs. The very subject-matter of the science comes to be looked at differently. Wealth is but a means of satisfying human wants, and, therefore, Economics, if “on the one side a study of wealth,” is “on the other, a more important side, a part of the study of man”. Further, as the author points out, no clear line of separation can be drawn between the “economic” motives which tend to wealth, and the moral motives which may lead elsewhere. Ricardo and his followers work as if it were otherwise: as if, indeed, there were no conflict of motives at all. “The people whom they knew most intimately were City men;” and on ‘Change it is usually supposed that all motives can be reduced to one. But something more than this has to be said in explanation of their tendency to treat all men as if they were City men. It is not necessary to limit in any way what Prof. Marshall says as to the Semitic origin of Ricardo’s peculiar genius for threading his way “through intricate paths to new and unexpected results”. But I suspect that the narrowness of his view of human motive was Benthamite rather than Jewish. He was the Benthamite economist; and he shared the narrowly intellectual and narrowly selfish view of human conduct which was characteristic of Bentham and James Mill and against which J. S. Mill struggled with incomplete success. “For pleasure—the greatest that can be got” was made to describe every motive, and this was easily changed into “for wealth, or the means of pleasure,” tempered only by aversion to toil. The Economics of last generation was thus coloured by its Benthamism, just as that of the present day is modified by various influences, but especially by historical study.

The historical school has contributed to a correct understanding of the laws of economic development. And Prof. Marshall follows the historical school in tracing the circumstances which have led to the present organisation of industry, and which are continually modifying industrial activity. But this does not lead him to discard as valueless the work of the deductive economists. The finality which even J. S. Mill ascribed to the Ricardian doctrine of value, of course, disappears. The author holds, however, that, in almost all their positive conclusions, the deductive economists were right; but that their conclusions were stated too broadly, and without bearing in mind the conditions under which they held true, and the limits of their application. In stating and keeping constantly before the

reader their conditions and limitations Prof. Marshall is more careful than any previous writer except Prof. Sidgwick. In this way he is able not only to retain all that was of value in previous economic theory, but to extend its bounds; and, by studying the effects of each force both in isolation and in different combinations, to reach new and generalised theorems, which are not limited in their application to the circumstances of fifty years ago. Of chief importance in this reference are the varied applications of the conception of Marginal Utility—what Jevons called Final Utility—and the connected extension and generalisation of the doctrine of Rent.

The whole theory rests on the presupposition that we can find some means of measuring economic goods and a man's desire for them. Now, just as, in the physical world, energy is measured by work done, so here a man's desire for any economic good can be measured by what he would give for it. And it would therefore seem unnecessary to take increments of pleasure as the unit of measurement, and thus to make Economics depend on a doubtful psychological theory.¹

Among the most instructive and interesting portions of Prof. Marshall's work are the passages in which he examines the relative advantages—the effects upon human well-being—of various industrial orders and conditions. The optimism of Adam Smith, which made him believe that industrial self-seeking was over-ruled “by an invisible hand” to promote the common happiness, was not unnatural at a time when free competition meant freedom from artificial restrictions and privileges. In many of his successors the doctrine persisted rather as an *a priori* dogma of the schools than as a position verified by experience. At the present time the pendulum of opinion has swung to the opposite extreme, and there is a tendency to charge free competition with all industrial evils—although the latest developments of industry are towards a state in which competition destroys itself and becomes merged in gigantic monopolies.² Prof. Marshall's discussion of these topics must be read in his book itself: they could not be given or commented on here without going into his special economic doctrines and mode of treatment with some fulness. It need hardly be said that they show the thoroughness and care in collecting material, and the judgment in estimating evidence, which are characteristic of the author's whole treatment of the facts of industry.

W. R. SORLEY.

¹ On this point reference may be made to Mr. J. S. Mackenzie's recent *Introduction to Social Philosophy*.

² With regard to this tendency of competition to “smother itself in its own smoke,” Prof. Marshall thinks that “it is the better opinion that popular rumour, going now as ever to extremes, has exaggerated some features of the movement towards combination and monopoly, even in America”. See Presidential Address to the Economic Section of the British Association at Leeds, 1890, on “Some Aspects of Competition”.

An Introduction to Social Philosophy. By JOHN S. MACKENZIE, M.A., Glasg., B.A., Cantab. Scholar [now Fellow] of Trinity College, Cambridge, and Assistant Lecturer on Philosophy in Owens College, Manchester. Glasgow : James Maclehose and Sons. Pp. xii., 390.

The reproach is often made, and with justice, against those whom it is the fashion to call writers of the neo-Kantian school, that they are so fond of insisting on first principles that they never reach the details at all. Mr. Mackenzie's philosophical principles may cause an initial difficulty to some readers, but at least he is free from this reproach ; and I hasten to add that metaphysical differences need be no bar to the profitable study of the greater part of his work. He attempts to apply what he considers true philosophical principles to the study of social questions, and to me he seems to be happiest where he abandons abstract discussion and attacks the more practical problems themselves. He exhibits abundant and accurate learning in treating them, and the constant references to the literature of the subject especially in Economics, will be found useful by the student. His learning throughout the book is indeed remarkable and there are few writers on any of the many questions raised to whom he does not do justice. At the same time the reader will feel a certain indeterminateness in Mr. Mackenzie's utterances on practical questions, which is hardly to be wondered at with the view he takes of the functions of philosophy, as holding before the mind the mere ideal of a system, which can never be completed in fact, and would cease to be philosophical if it could. He even apologises in one place (p. 367) for "seeming to touch too closely on special measures and institutions". I, for my part, am glad that he has not been content with mere reiteration of the principle that we must see life as a whole, and that he has given some body to his ideas. The book is as a whole very well written, and for this reason I expostulate with him on his abuse of poetic quotation. I have counted those quotations which are distinguished by type and verse, and find on an average one to every eleven pages ; besides innumerable fragments in the text. Mr. Mackenzie can put his ideas so well himself that he ought to have avoided this temptation of the accomplished man.

It is an ungrateful task to have to begin by finding fault ; but the first of Mr. Mackenzie's chapters, in which he explains the scope of Social Philosophy, appears to me the least satisfactory part of the book ; partly because it raises ultimate issues which it is impossible to deal with in a short space, and partly because it is not in itself perfectly clear. Social Philosophy, he holds, is concerned with that debatable land which the economist and the moralist in deference to one another regard as neutral. But it is not to be confused with Sociology and is rather "a systematic effort to deduce the laws of social life from certain primary principles which are ascertained by philosophical

analysis" (p. 12). Starting from Aristotle's classification of causes, he then seeks to show that philosophy arises in two ways—whenever by a consideration of the laws of things we are led on to investigate the "necessary forms which give determination to all thought and things," and secondly, whenever ends or ideals are concerned. The philosophy of society will thus investigate the meaning of social life and consider its meaning as having reference to an ideal. As to the first of these statements, whether an analysis of the meaning of society should be called philosophy or science might seem to be a matter of names. In reality it is not so, but raises the whole question of the principles of 'neo-Kantianism,' with which it is impossible to deal here. As to the second statement, I observe only that ends or ideals are nothing but the formulation of desires, are as much psychological facts as perceptions, and in themselves call for no philosophy; nor does the fact that they are intellectual make any difference. But the two statements taken together point to a confusion which runs through this chapter and affects Mr. Mackenzie's whole conception of his problem. Philosophy is treated now as a science which explains the ultimate nature of things, and now as having a special connexion with practical interests. In the second capacity it ceases to be merely a summary of knowledge; it becomes an aspiration, a practical effort. And in keeping with this, philosophy is described in an eloquent but, as I think, rhapsodical passage (pp. 33-7) as being "not a truth which is grasped, but an inspiring ideal which shines through". That this conception of philosophy produces a certain vagueness in Mr. Mackenzie's work has been already remarked. In fact, he seems to confuse philosophy with legislation or practical effort as directed by the largest possible view of things,—a view which is popularly described as philosophic only because philosophy is that which gives us the ultimate conspectus of all knowledge, and all large-mindedness has therefore the spirit of philosophy. In consequence his *Social Philosophy* is not a clearly marked science, but a mixture of Ethics and Sociology with certain discussions in practical legislation, which are not really science at all but practical portions of Ethics or Economics and are hence partly included in such economical works as Mill's or Prof. Marshall's. The most valuable parts of this chapter seem to me those on economic science.

However, the discussion of the limits of a science or a philosophy is always apt to be tedious and unprofitable. I could wish chapter i. omitted altogether, if that were possible. Chapter ii. really begins the subject, and is excellent. It is entitled, "The Social Problem," and begins by showing how the present problem originated, in a historical survey of much learning. Mr. Mackenzie rightly speaks of the present time as the period of social organisation in contrast with the preceding age of liberation from authority, and the earlier age of subjection of the individual to

religious and military control. Then follows a survey of modern conditions—conceived probably with a reminiscence of Bacon's procedure in the first book of the *Novum Organum*—in which he first discusses the difficulties which we have to deal with, and especially the familiar industrial disorders which Carlyle has brought home to the consciences of all; and then passes to the "conditions of hope," pointing out with much force how the very circumstances which disintegrate society tend also to consolidate it. Similarly, while he traces the evils of individualism and materialism as "developments of thought that impede us," he points out how they also contain promise of "developments of thought which help us". I give hardly more than the headings of the sections of the chapter, which is very interesting and carefully worked out.

In chapter iii. we return to the more abstract question, with a long and minute examination of the idea of organism which is so habitually applied to society. The organic unity is distinguished from the other forms of unity which may be conceived—forms of unity which are sufficiently described by their titles as the unity of monadism and of monism. The differences produced by these different conceptions of society in various departments are drawn out. Mr. Mackenzie rightly enough remarks that, instructive as is the analogy of the organism to society, its immediate value is that it clears the mind of less suitable analogies, and that it must be examined in itself if it is to be more freely applied. But, finding that society agrees with the organism in respect of the central questions—" (1) Are the parts intrinsically related to the whole? (2) Does society grow from within? (3) Has society a reference to an inner end?"—he next proceeds to the difference produced in society by the presence of self-consciousness. Then follows an elaborate statement of the possible senses of self-consciousness: the two most highly developed forms of which are, first, that in which an organic being becomes conscious of itself as a *unity*, which Mr. Mackenzie thinks, on doubtful evidence, may be present in the animals; and, last, that self-consciousness, which, though only the development of what is found below, yet really makes the difference between man and animals. The self, in this last sense, is the self as a system or a world of experience—as, for instance, the cosmos of experience which Shakespeare created for himself and revealed to others. Such a whole of experience stops short only with the possession of a completed science and philosophy. Hence the need of society, where man finds his aspirations after a completion of experience satisfied. I am obliged to represent all this very shortly, though it is philosophically the most interesting part of the book. I find in it the same want of substantiality in fact, with grandeur in appearance, which exists in Mr. Mackenzie's conception of philosophy itself. And, so far as I understand him, I think his method of working up to his conclusion open to grave doubt. It seems strange to

treat as what is characteristically human that which can exist in consciousness only under exceptional circumstances. Not all men are burdened with this consciousness of a cosmos of experience. And though there is no doubt whatever that, as a fact, human nature and society go together, the organic character of society cannot be said to "flow from the principles of human nature". This appears to be an instance of that inversion of the natural procedure which Fechner described as the method from above downwards. It is surely simpler, and, at any rate, less misleading, to show how the fullest development of self-consciousness comes from that enlargement of an individual's experience by the acknowledgment of similar individuals which arises in society. This is almost a commonplace of the psychologist; and it is necessary to say this because, though Mr. Mackenzie gives to his discussion a metaphysical air, he does not, I suppose, mean anything more than this.

Chapter iv. is a chapter in ethics, dealing with the social aim, and reviewing one by one the various ends which have been proposed by ethical writers. Pleasure has necessarily the largest share of the discussion; hedonism is criticised with the arguments familiar to readers of Green, but with some freshness of treatment. One feels that the true proportions of pleasure in the End are misrepresented in this method, for it really does not matter so much what particular writers have said about pleasure as what part the thing pleasure itself plays. Mr. Mackenzie insists that pleasures are different in kind, and in this general statement I believe him to be right; but I do not feel sure whether in saying that pleasures contain an element of preferability or sense of value he does not imply that this sense of value is inherent in the pleasure. This must be denied. The pleasure of drinking and that of thinking are different in quality only in the same way as white colour is different from red colour. The sense of value of the pleasure is *founded upon* this difference in quality, but is itself the product of growth, and does not belong to the pleasure as such; and the word preferability must be understood as being used only in an anticipatory sense.¹ Mr. Mackenzie describes the social end (as might be expected) as consisting in the satisfaction of wants, and more precisely, rational wants—self-realisation understood in the large sense in which the self is conceived; and this seems to be equivalent to satisfaction of ourselves according to that clearness of view which arises from an understanding of the world and our relations to it. Here we have the purely metaphysical idea of a completed whole of intelligence coming in to modify (and spoil)

¹ Mr. Mackenzie has done me the honour of referring here, among other places, to my work. However, I have been careful to state that I used 'preferability' as above defined, and for want of a better word. Perhaps Mr. Mackenzie means the same thing, but I do not feel clear that he does, and I rather think not.

the ethical conception of social solidarity, which is the interest the author has most at heart.

The last two chapters are, I think, along with chapter ii., the most interesting portion, but they cannot be represented without going too largely into detail. In chapter v. he treats of the Social Ideal, reviewing the ideals which have been at various times proposed. Under the name of the Ideal of Equality, the various forms of Socialism are discussed. The criticisms are sensible, but they probably exaggerate very much the extent to which collectivism would impair the development of individual energies, and therefore indirectly of the whole of society. And Mr. Mackenzie treats scarcely adequately that form of Socialism which is the only one moderate persons regard as worth discussing—that in which there is no absolute equality, but relative equality, that is, where the large services of the gifted man are considered equal to the slight services of the commonplace man, provided each is set to do the work he can do best. Assuming the existence of such a sentiment (and it exists in many religious ideas), the fact that individuals are so differently gifted would cause no difficulty. Doubtless, the real difficulty is to create such a sentiment, and it is the view of this which makes Mr. Mackenzie look with the greatest favour on the ideal of fraternity, which means a readjustment of hearts rather than of external conditions. This is the cause to which such societies as the Ethical Societies of America and London devote themselves, and few will doubt (certainly not I) that it is a noble cause. But a man may seek to develop such a sentiment and yet feel that this alone is insufficient by itself as a solution of all our troubles; that in order to make the education of sentiment effective those moderate changes of social organisation are necessary which will supply a practical field for the exercise of the sentiment.

In chapter vi. we have a discussion of the different points in which Social Progress may be expected. They are considered under the head of the three elements which, according to the author, are involved in human well-being, *viz.*, the subjugation of nature, the organisation of society, and personal development. Under all these heads there are many good remarks, and the chapter is useful as giving a kind of general conspectus of questions in which reform is possible. When Mr. Mackenzie speaks of the nation, he is principally concerned how to bring about the desirable consummation that philosophy should be king; or, as others might prefer to express it, that in our democracy legislation should be inspired by the widest views. He finds the hopefullest outlook in the habit of our great writers of dealing with subjects of social welfare, in the influence of the churches, in the spread of scientific views about social and political questions, in the efforts of voluntary associations instituted for social ends, like the Trades Unions, the Knights of Labour, the Ethical Societies. In this way he thinks democracy may be leavened by wisdom. But he

lays the greatest stress on personal development and on education as a means to it; and the chapter concludes with insisting on the necessity of imparting wisdom as founded, in the last resort on philosophy, that is, a wide view of life. The remarks on the object of education in general and on technical education (with which may be compared Prof. Marshall's treatment of the same topic in his recent volume), on the restrictions which have to be placed upon the action of government in interfering with the individual, the description of the various forms of social organisation from the family up to international organisation are all worth attention. It is hardly possible to do more than indicate the nature of the chapter. The only general criticism which I can pass upon it is, that it would be much simpler if instead of philosophy we were to read everywhere an enlarged idea of our duty to our fellowmen and an enlarged devotion to their service. In conclusion, I can only regret that in having to speak of the more debatable questions of principle contained in the book, I have had less space left to report the more special and detailed portions in which I consider that the chief value of the work lies.

S. ALEXANDER.

L'Évolutionnisme des Idées-forces. PAR ALFRED FOUILLÉE. Paris : F. Alcan, 1890. Pp. xciv., 303.

This work contains the substantive account of the author's theory of *Idées-forces*, which was promised in his *L'Avenir de la Métaphysique*, noticed in *MIND*, No. 59. As indicated by the departure from the original title (*Principes généraux d'une Philosophie des Idées-forces*), the mode of treatment is still, as in the former work, in the main critical rather than purely constructive, and, in particular, assumes the form of a revised interpretation of the doctrine of Evolution. After expounding, in a masterly Introduction, the general principles of an evolutionism of *idées-forces*, and showing the importance of the conception for psychology, for metaphysics, and for ethics respectively, M. Fouillée proceeds, in the body of the work, to discuss these "principles" more minutely, first in their psychological, and then in their metaphysical significance. The discussion is divided into four books, the first of which, dealing with the "general characteristics and value of states of consciousness," investigates the psychological basis of the theory, while the other three contain its critical vindication. Though the more minute and largely psychological nature of the investigation does not afford the same scope for the author's gift of telling, antithetic style, the present work is marked throughout by the same clearness and pointedness of statement as characterised M. Fouillée's previous writings. It has the additional and peculiar interest attaching to the exposition and defence of its author's central philosophical conception, suggested and critically em-

ployed in his earlier books, and to be further developed in detail in a treatise already announced as in the press, *La Psychologie des Idées-forces*, which again is to be followed by *La Morale des Idées-forces*. Whatever we may think of the doctrine elaborated in these works, we cannot but marvel at the almost Spencerian comprehensiveness of M. Fouillée's philosophical activity.

The conception of Evolution against which M. Fouillée's protest is throughout directed, and for which he would substitute the "evolutionism of *idées-forces*," is the mechanical or Spencerian. The two 'great gulfs' which he finds 'fixed' in the evolutionary theory as taught by Spencer—that between the inorganic and the organic, and that between the organic and the conscious, are both due, he holds, to the "entire elimination of factors of a mental order from the number of primitive and active factors of evolution". The logical consequence of such a theory, according to M. Fouillée, is the reduction of mental life to the mere passive reflexion of the physical mechanism, the inclusion of man, with all his so-called 'powers,' in the Cartesian "automatism"; a consequence that is accepted by "a whole school of contemporary psychologists, Huxley, Bain, and Maudsley," who, led by Spencer, proclaim that "the facts of consciousness are 'subjective and accessory aspects' of the living automaton". The thesis of M. Fouillée's work is the vindication, as against this "school," of the energy, efficient causality, or *force* of "ideas" (*idées*); or more precisely, the tracing of *all* efficiency to "ideas" as its ultimate source. Further, in this efficiency of the mental or ideal, is found the clue to universal evolution; "ideas," being the efficient "forces" of the universe, are the guiding factors in its evolution. "The capital question to which we shall relate all others, is, to know whether ideas . . . can become real *factors* in the mental evolution, internal forces capable of reacting upon that evolution, and, by its mediation, upon the universal evolution." Finally, while the evolutionism of Spencer is transcendent and virtually dualistic, that of the *Idées-forces* is a Monism immanent and experimental. The activity of the "idea" finds its play within the physical mechanism. "Real nature knows not our abstractions." "Ideas" are links in the endless chain of causation, which is *at once* physical and psychical. The "principle of immanent and experimental Monism," accordingly, is the following: "All the facts of the universe, without exception, must be embraced in the bonds of action and reaction, and form a single dynamical whole". Within this whole, however, there must be, not merely a "harmony," but a gradation or "hierarchy" of forces; and the fundamental or primary "force" is not the physical but the psychical, not motion but volition. Instead of mental states 'reflecting' material, the latter are the expression or manifestation of the former. Hence the title of the theory maintained by M. Fouillée, *Idées-forces*, in opposition to *Idées-reflets* or *Idées-ombres*, which would characterise the counter-

theory, implying that ideas are not real factors of the causal process, but only "symbols or aspects" of reality.¹

Evolution, in the mechanical sense, M. Fouillée maintains, is so far from being a philosophical explanation of the universe, that it presents a new problem for philosophy to solve, the problem, namely, of the *origin* of that movement whose transformations it describes. This is found, he insists, not in external action or impulse, but in the reaction of the being or thing acted upon; the source of all movement, and so of all evolution, is to be found in the inner nature of things, not in their outer relations; or, in the usual language of philosophy, in the subject rather than in the object. The reaction of the 'subject' may be called "appetite," or, more generally, the "appetitive process"; as Aristotle said, 'all movement is a sort of appetite'. "Appetition is to be traced under every motion of living beings, and the most mechanical movement of their cellules implies an infinitesimal appetite; . . . it is not only the movements of animate beings, reflex or other, that imply, as their internal source, at least an infinitesimal rudiment of feeling: but all movements, even in the inorganic sphere, are probably obedient to the same law." For, since all movement follows the line of least resistance, and in the interpretation of this fact we can only reason after the analogy of what occurs in ourselves, we must conceive "the secret force which produces movement as an activity tending to expend itself with the least possible effort. This activity is just the appetitive process or the primordial will, that is to say, desire, which, while accompanied by feeling more or less dull, is itself unreasoned and unintelligent. . . . Thus, in opposition to the *savants* who, following a tendency entirely materialistic, seek to trace the mental order to an automatic mechanism and a complexus of reflex actions, we see how, passing from psychology to cosmology, it is necessary to establish an element of the mental order amongst the principles of the universal order and of the universal mechanism. . . . As this production or circulation of movement in the universe is unintelligible without a universal activity, so this activity itself is unintelligible for us without a universal sensibility." As Leibniz said, 'there is nothing dead in nature'. "Everything is produced by way of mechanism, but, at the same time, everything is produced, if one may say so, by way of sensation and appetite."

Thus the "immanent and experimental monism" which M. Fouillée offers us, consists in a resolution of the physical into its psychical elements, of movement into appetite. The mental,

¹ *Idee*, it should be noted, is used by M. Fouillée in the wide Cartesian sense. It includes "all states of consciousness in so far as they are susceptible of being reflected upon, and thereby of reacting upon themselves, upon other states of consciousness, and finally, thanks to the union of the physical and mental, upon the organs of movement".

far from being the product of evolution, is found to be its initial factor. "Thought" or "consciousness" is present, though it may be in a very vague and indistinct form, in the earliest as in the latest stages of evolution; and it is through its constant presence and operation that the evolution takes place. "That is why, giving the name of *ideas* to all states of consciousness which exist more or less for the subject, and are more or less representative of objects, we shall have the right to speak of *idea-forces* if we succeed in disengaging the internal source, at once appetitive and representative, of that mechanism of which science describes the external effects."

The "appetitive process," just described as constituting the inner nature of things, and so containing the ultimate explanation of their evolution, is variously defined by M. Fouillée as "an impulse accompanied by vague pleasure or pain," "a need seeking for its satisfaction," the "reaction of the conscious subject," "the response of the within to the without," "a state of consciousness, if not an act of intelligence". The "consciousness" implied in appetite, it must be observed, is not reflective consciousness of the end pursued, but merely direct and, it may be, indistinct consciousness of the acts themselves through which the end is attained. For while "the term *intelligence* . . . indicates prevision, adaptation to a preconceived end," and is applicable only to the later or more evolved stages of consciousness, "feeling" or "appetite" is necessary to all existence and activity, and feeling always implies consciousness of feeling.

In the germinal or appetitive consciousness we can distinguish the three elements present in all its later forms—*viz.*: (1) an element of sensation or receptivity, the occurrence of a change; (2) an element of feeling or emotion, a pain or pleasure more or less vague; (3) an element of activity or will, the reaction of the being, resulting in a new change. Thus it is not in Knowledge, which, "seizing only relations, remains always more or less superficial," but in Appetite, which is the germ including it, that we must seek the secret of the universe and of all its changing life. "The most obscure and rudimentary state which we can represent to ourselves is an indistinct activity implying a vague discomfort and a vague well-being, and in which the intellectual side is not yet disengaged from the emotional." This original activity or effort may be called indifferently the "primitive appetite" or the "primitive will". Not that it implies choice. Present voluntary actions are the result of "voluntary actions in the simple and impulsive state"; actions which follow upon a conflict of motives are the later result of acts of the original spontaneous will.

Such a theory, it is insisted, preserves the continuity of the universe, that is, interprets its character *as* a universe, as no other theory does. It allows no break between the highest and the lowest terms of existence, between the intellect of a Shakspeare

and the inert mass of 'stocks and stones'. For, in truth, nothing is dead or inert; everything is instinct with life and movement. As in the universe of Leibniz, all things are conscious or 'perceptive', though all are not self-conscious or 'appreceptive'. The difference is not between the conscious and the unconscious, but in the *degree* and *intensity* of consciousness. There is, strictly, no "unconscious," only the conscious and the "sub-conscious"; or the clear and reflective, and the obscure and unreflective consciousness. From the "purely sensitive consciousness," consisting in "general and continuous sensibility" (*coenesthésie*), we rise gradually to the "intellectual consciousness," as the specific appetites or desires differentiate themselves from the "mass of general appetite". Even the passage from consciousness to self-consciousness is a gradual one. Everything is, in a sense, a 'self,' and, as such, reacts upon the universe of 'selves'; only its consciousness of itself is more or less vague. In this regard, the theory which derives the conscious from the unconscious is convicted of two confusions; (1) of indistinct and obscure consciousness with unconsciousness, and (2) of consciousness in general with self-consciousness. "Self-consciousness is only the highest and most centralised form of the reflective consciousness, which is itself already distinct from the spontaneous and general consciousness. . . . This sort of polarity of consciousness can only produce itself in the bosom of a more general consciousness, not yet differentiated into subject and object, a consciousness, however, whose generality is not on that account to be identified with unconsciousness."

The above is a mere outline of the able and persuasive argument by which M. Fouillée seeks to establish his central philosophical position. The main argument is supported by a number of valuable criticisms of opposing theories. The author is particularly strong in psychological analysis, and the amount of valuable psychology in the present work is very considerable; for example, the analysis (referred to above) of the "appetitive process" into its three constituent elements, and the account of Instinct and of Habit. Nor could anything well be more telling than the criticisms of the various forms of the theory which derives consciousness from the unconscious (in the Introduction and bk. i.), of the "automatic" theory of consciousness (in bk. iii.), and of the "two aspects" theory (in bk. iv.). If space permitted, it would repay us to follow the author into these often minute discussions; all that can here be done is to commend them to the careful attention of students of psychology and metaphysics, and pass on to a general estimate of M. Fouillée's main position.

Perhaps the chief value of the book is the criticism it contains of the mechanical conception of Evolution, implicit in the Darwinian theory of 'Natural Selection,' and rendered so popular in these days by Mr. Spencer. And, though directed specifically against mechanical and "automatic" theories of evolution, this

criticism is valid against materialistic theories of every complexion, and is a spirited and often brilliant defence of an idealistic view of the universe. Further, in his own theory of *Idées-forces*, as sketched above, M. Fouillée offers a contribution, at once courageous and skilful, towards a reconstruction of Idealism. For an idealistic, like a mechanical philosophy, is apt to rest content with a universe of mere relations, accounting for the *how*, but neglecting the *what*; giving us, it may be, a universe in general, but not the universe of living reality. Now, M. Fouillée attempts, by at once maintaining the primariness of the psychical (the *idée*), and conceiving it dynamically (as a *force*), to resolve the generality of the ideal universe into a cosmos of individual psychical centres (appetitive or volitional). The author makes the additional and important claim for his theory, that it reaches the true unity of things, which, as already maintained in his *L'Avenir de la Métaphysique*, is not transcendent and unknowable, but immanent and experimental, *fondée sur l'expérience*. Activity, which is essentially internal and psychical, not external and physical, is, it is insisted, the heart of the actual universe. There are not two spheres, or even "aspects" of Reality, but only one, and that the spiritual; there are not two evolutions, but only one, the evolution of Mind or Spirit; there are not two forces, but only one, the *idée-force*. "Consciousness, far from being without reality, is the immediate presence of reality to itself, and the internal unfolding of its riches." In consequence of "the profound identity of will and movement, . . . in seizing volition, we seize the *reality* of motion itself, its actuation". For we must interpret the universe by its highest term—thought, not by its lowest—matter; "a philosophical theory must include the totality of experience, not merely fragmentary parts or aspects of it". This fragmentary character inevitably attaches, according to M. Fouillée, to the external or physical; the internal and psychical alone is fitted, in virtue of its complete and all-inclusive character, to stand as the constitutive or real unity of things.

The theory calls for a word of criticism. It is to be feared that, in the eagerness of his reconciling project, M. Fouillée has been led to sacrifice, or, at least, not sufficiently to safeguard, some of the essential elements of a true Idealism. Notwithstanding the firmness of his insistence upon the primary and fundamental character of the ideal or psychical, upon its completeness as including in itself all the characteristics of reality, and upon its supreme importance as the moving cause in all evolution, there is a certain tendency to co-ordinate motion and consciousness as equally primordial and independent factors. Such a tendency appears, not only in statements of the evolutionary process, where it might result from accommodation, conscious or unconscious, to the language of popular thought, but in the very choice of the name *Idée-force*, in which the author may be supposed to sum up his theory. This name, while it expresses aptly enough the

central purpose of the book—the reconciliation of an idealistic with a mechanical interpretation of the universe and its evolution, itself suggests, if it does not imply, a certain mechanical, and therefore inadequate, conception of mind. Mental activity may include and explain mechanical movement, but the former is not to be formulated in terms of the latter. In other words, while all forces are ideas or objects of consciousness, ideas cannot, except metaphorically, be described as forces in the mechanical sense. That superiority of rank which is so ungrudgingly conceded to the mental by M. Fouillée, renders much of his phraseology inappropriate, and, to a certain extent invalidates his proposed conciliation of Idealism and Mechanism, at least in the form stated. Such a conciliation is impossible so long as thought is regarded merely as one, as motion is another, “factor” of evolution; it becomes possible only when the idealistic or teleological interpretation is resolutely held to, as not excluding but including the mechanical.

Once more, it is not to “ideas,” after all, but to the “mind” (*l'esprit*), that efficiency or “force” belongs. This is admitted by M. Fouillée in his criticism of Herbart and the Associationists. The question remains, therefore: What is the “Mind”? M. Fouillée's only answer is that it is “Will” or “Appetite”; and this again turns out, on analysis, to be but the general mass of rudimentary feeling, the *Streben* which man shares not merely with the “brutes,” but with “minerals”. Deliberate choice being dismissed as “unessential,” all that remains as the essential germ of Will, and so of man's spiritual being, is the mere blind impulse to *be*. How, from such a start, the goal of moral Will is to be reached, I do not see. It is possible that such a difficulty is the result of a misunderstanding of the theory in question. The metaphysical and the psychological are so intertwined in M. Fouillée's argument that it is often difficult to disentangle them. As a psychological account or ‘natural history’ of Will, I am not prepared to question the validity of the theory. But if it is offered as a metaphysic, such an account seems to me to contain difficulties of the same kind as those which M. Fouillée has so acutely exposed in mechanical evolutionism. A stronger insistence upon the teleological element in Idealism might have saved the theory from this as well as from the former defect.

JAMES SETH.

Die Entwicklung des Causalproblems von Cartesius bis Kant. Studien zur Orientirung über die Aufgaben der Metaphysik und Erkenntnisslehre. Von Dr. EDMUND KOENIG. Leipzig: O. Wigand, 1888. Pp. vi., 340.

Die Entwicklung des Causalproblems in der Philosophie seit Kant. Studien zur Orientirung, &c. (Zweiter Theil.) Von Dr. EDMUND KOENIG. Leipzig: O. Wigand, 1890. Pp. xii., 488.

These substantial volumes form a piece of work that was well worth doing, and is very well done. In the shape of studies of particular thinkers, they include both a history, in effect continuous, of modern theories of Cause, and an independent discussion of the scientific validity of the conception and its philosophical basis. The author, it may be noted at the outset, proclaims himself a Kantian; and being, as nearly as possible, a pure Kantian, he finds much to agree with in English experiential philosophy both before and after Kant. It is on the experiential side of Kant that he especially dwells, one of his principal results being the rejection—in reference to the conception of Cause—of philosophic rationalism. Not merely the particular phenomena that are thought of as causally connected, but the causal relation itself, is given in experience. A mental "activity" is required to turn the "given" order into a necessary connexion; but the criteria by which we know that the relation is one of cause and effect are wholly experiential. The rationalistic view of the causal sequence, the notion of the effect as *deducible* from its cause apart from previous experience, though not yet wholly banished from scientific thought so far as it is uninformed by philosophy, can no longer have any place in the philosophical theory of science.

The rationalistic notion of Cause, as the author begins by showing, was the predominant one at the opening of modern philosophy. By Descartes it was expressly formulated, and over English philosophy down to Locke it retained a powerful influence. Cause was defined as that from which the effect follows with necessity; the conception of the effect being necessarily involved in the conception of the cause. The starting-point was here given by certain scholastic definitions; but the notion of Cause took its distinctively modern character first from its combination with the monistic doctrine of the unity of composition of all things, and then from its expression in terms of the "mechanical philosophy". That it could be made use of for the actual explanation of nature was owing to the genial employment, by the founders of modern physics, of the method of analysis. Galileo's foundation of dynamics, for example, was the result of the application of analytical thought to experiences of motion. Such elements in the phenomenon were distinguished as could be experimented upon in sufficient isolation. Whatever discoveries might be made

by experiment thus directed, it was nevertheless a long time before science attained the conception of an observed uniformity as constituting a natural "law". For Galileo, as for Descartes, no proposition was entitled to rank as a "law" unless it could be deduced rationally from some immediately evident axiom. The art, it is true, was in analysing complex relations into simple relations that could be established or disproved by experiment; but to the completed process the form of a deduction had to be given. So long as the relations were those involved in the communication of motion by contact, they appeared so obvious that little question was raised as to pure deduction's being the ideal method. The "mechanical philosophy" could look forward to a complete demonstration of all natural processes from the definition of matter as having figure and impenetrability, together with like simple definitions of motion and so forth. Newton's employment of the principle of "action at a distance" was regarded by the "mechanists" as a falling off from this view; such action not being deducible from their definition of matter: and even Newton did not venture at once to reject the conception of a physical axiom as an immediately evident principle, and of a scientific "law" as to be deduced from axioms. Gravitation was asserted as something really occurring, though not in itself immediately intelligible, that might in the future receive deductive explanation. The Newtonian principle, in the meantime, was found to furnish a thoroughgoing scientific interpretation of the planetary motions such as the rigorous "mechanical" doctrine could not give, and so tended to bring into vogue an experiential philosophy for which ultimate natural laws were neither deducible from mere general axioms nor immediately evident. Then, as scientific research made its way more and more into details, there went on an accumulation of observed uniformities that could not be deduced from any recognised principles. Such uniformities also came to be called "laws," and the conception of a scientific law as a uniformity, whether deducible or not, at length became the prevalent one.

Partly promoting and partly promoted by the scientific movement towards experientialism, there was a properly philosophical movement. The Occasionalist school, anticipating later "Positivism," denied that there is any rationally deducible or immediately evident connexion among natural events; nature, so far as accessible to science, being regarded as "phenomenal," or as consisting of appearances without real "intelligible" relations to one another. To natural science is refused the rational character that Descartes strove to impress upon it. The only recognised "cause," in the older sense, is the will of God. All relations discovered by science are, therefore, arbitrary connexions. It is not to be judged apart from experience what connexions exist or do not exist in nature. There is a fixed order in things, but no real efficiency. The efficient cause is.

"metaphysical". A rationalistic metaphysic is thus combined with an empirical and phenomenist view of natural law. Independently, the English experiential movement made way. From the ground of Locke's psychological criticism of knowledge, Berkeley proceeded to a completely phenomenist view of nature, and Hume to a phenomenism (in combination with scepticism) extended universally. The conception of the causal relation as a necessary connexion, involving an intelligible "power" of the cause to produce its effect, became untenable as far as the phenomenist view extended. With Berkeley it disappeared for corporeal things, but not for "spirits"; with Hume it disappeared altogether. Scientifically, no causal connexions—not even the most "obvious" mechanical ones—could now be asserted prior to experience. Influenced or not by this movement, the scientific rationalism of Descartes, while it was carried forward, was also made less rigorous. In Spinoza, indeed, it reached its consummation; but Leibniz, by his principle of "sufficient reason," prepared the way for an experiential view of natural law, combined with an *a priori* theory of knowledge. Kant, as the author maintains, brought the double development to a conclusion which is, in essentials, definitive. Later thought, while it has not failed to be penetrated to some extent by the Kantian criticism, and has made great advances in detail, has yet recurred, more or less, on one side to rationalistic doctrines of the pre-Kantian type and on the other side to pure experientialism. A return to the Kantian criticism is still necessary, in order to correct the results of thinkers like Comte or Mill on the one side, and Herbart or Lotze on the other.

This is a general outline of what the author aims at showing historically. Let us now try to follow him in more detail, bringing out his most interesting points in relation to particular topics.

First, it may be useful to recapitulate the names of the thinkers discussed. They are, in the first volume: Descartes, Malebranche (as representing Occasionalism), Spinoza, Leibniz, Wolff, Crusius, Bacon, Hobbes, Locke, Berkeley, Hume, the Scottish School (Reid), Kant; in the second volume: Maine de Biran, Schopenhauer, Trendelenburg, Herbart, Lotze, Comte (omitted in the table of contents), Mill, Ernst Laas and Carl Goering ("German Empiricists"), Spencer, Riehl, Hartmann and Volkelt ("Transcendental Realists"), Wundt. The work is rounded off by a general "Introduction," a special introduction (to the first volume) on "The Causal Conception in the Natural Science of the seventeenth and eighteenth centuries," and conclusions (to the second volume) on "The Causal Conception in the Natural Science of to-day" and "The Causal Conception in the Psychology of to-day".

The maxim of Causality—or, more generally, of Uniformity of Nature—whether it is explained according to rationalistic or experiential principles, may be stated either as a law of per-

sistence or as a law of constant sequence. With the rationalists of the seventeenth century, it tended to take the form of a law of persistence of matter and "motion". Simultaneity of cause and effect, and the implication of effect in cause, result from the purely logical view of the relation. To this view the ancient position that nothing is created or destroyed was taken as equivalent, and was asserted for the whole history of the world, so far as accessible to science. Revived Atomism asserted it for matter; and by Descartes and Leibniz it was applied in different ways to motion. Here, what the great speculative thinkers really did was to "postulate" that in motion there is something quantitatively constant. By purely rational deduction no approximately accurate formulation of that which is constant was arrived at except by accident. Leibniz's view that motion, when there is question of its constancy, ought to be measured by *vis viva* and not by momentum, could not be established deductively against any other view. Yet it was the constant affirmation of such extremely general principles, supposed to be axiomatic, that pointed out the way to special investigators. The atomic hypothesis has been taken up into exact science. So also the assertion of constancy in "motion" got accurate formulation and proof, when in recent times the law of Conservation of Energy was experimentally established. A law of a certain type, or a very general hypothesis, had all along been in view as a possible means of co-ordinating phenomena. Scientific insight had only to detect the right moment for recurring to the hypothesis, or for seeking accurate experimental verification of a precise formula.

With the theories based on Gravitation and Natural Selection, as might have been shown at length, the case is somewhat different. Here an observed process, which had only been taken into account within a small range, or had been incidentally generalised in a more or less conjectural manner by some isolated thinker, was all at once taken up and made the principle of a system of scientific explanation of the highest generality. For this reason the achievements of Newton and Darwin are rightly looked upon as the supreme expressions of scientific genius. Philosophic thought had not so distinctly prepared for them as for the achievements of Dalton and Joule.

The *method* of the rationalistic thinkers, we may say in general agreement with Dr. Koenig, is to a large extent justified. A large part of science owes its origin to philosophic thought ascending very rapidly to the most general principles; and even where philosophic thought has had less part in the origination of scientific theories, bold speculation and hypothesis are just as necessary as experiment. It was the conditions of *proof*, as distinguished from discovery, that remained to be established by the philosophic experientialists. The rationalistic error was not in inventing theories before finding out all that can be known of the facts, but in supposing that there can be any valid

deduction of a natural process from principles of knowledge apart from the constant appeal to experience.

This error, as Dr. Koenig shows, assumed two forms. One of its forms was the supposition that effects can be deduced from causes by the logical law of Identity. The other was the attempt to construct natural laws by pure mathematics. In the thinkers of the seventeenth century the two forms are not clearly distinguishable. Among the post-Kantians Herbart illustrates the attempt to reduce all science—mathematics included—to formal logic; while the idea of a geometrical construction of effects from causes is illustrated in its purity by Trendelenburg. The Herbartian view, looked at from one side, is an extreme rationalism. Yet when the Kantian distinction between “analytic” and “synthetic” judgments disappears in complete vagueness, so that no *a priori* is recognised but the laws of formal logic, an approach is made to experientialism.

The first advance beyond pure rationalism on its own lines was the introduction by Leibniz of the principle of “sufficient reason,” or of “ground and consequent,” as a scientific principle. Theoretically it was still held that all laws ought to be deduced from immediately evident principles of knowledge; but, when deduction was impossible, the actual existence of an experimental sequence under proper conditions was held to indicate that one phenomenon is the “cause” of another which constantly follows it. That is to say, if we knew its nature thoroughly we should be able to think it as the intelligible “ground” of the “effect,” or succeeding phenomenon, which accordingly is to be regarded as its “consequent”. The appeal to experience was admitted more explicitly by Wolff, who expressly asserted the distinction between the “ideal” and the “real” ground, left vague by Leibniz; and still more explicitly by Crusius, who made the real co-ordinate with the ideal ground, to which it had hitherto been subordinated. Thus the Leibnizian rationalism, even before Kant, was still further weakened.

In the meantime the rationalistic view, consistently worked out, had led to the assertion of a stringent determinism. Spinoza had here developed the doctrine to its legitimate conclusion. He also, first of the moderns, had found a reconciliation of determinism with the “moral freedom” of man. This was not a new problem taken up by Leibniz, as it is sometimes made to appear; nor did Leibniz, in his solution of it, succeed in attenuating the Spinozistic determinism to the smallest extent. His “moral” or “teleological” determination is no less really “necessary” than the logical or mathematical determination of Spinoza.

On the ground of experientialism Hobbes had already asserted a deterministic doctrine as rigorous as Spinoza's. By Hobbes and Spinoza, whether determinism was strictly demonstrated or not, the proof of “metaphysical freedom” drawn from the declaration of self-consciousness had been rendered once for all impossible. This is henceforth a “classical truth”.

The further transformation of rationalism by Kant consisted, so far as causation is concerned, in assigning not only all particular causal sequences, but the form itself of the causal relation, to experience; the thinking mind being held to contribute simply the affirmation of the causal relation as "necessary". This affirmation is *a priori* because it is added to the "given" experience. And nothing in it is *a priori* but the "intrinsic constraint" by which the given causal order is turned into a necessary connexion. Thus rationalism in its older form has entirely disappeared. The results of the English critical movement have been incorporated in the Kantian doctrine. The doctrine is now, as the author expresses it, "Positivism"—but with "Apriorism" superposed.

More exactly, while upholding "Positivism" against "Rationalism," and "Phenomenalism" against "Realism," Dr. Koenig at the same time places himself on the side of "Apriorism" against "Empiricism," and of "Intellectualism" (as he says) against "Sensualism". To understand his theory of Kant's view of causation we must therefore follow out separately his history of the *a priori* doctrine in modern philosophy.

The "*a priori*" is not the "innate". Locke's polemic against "innate ideas" present as such before "perceptions," was fully justified. Even in the Cartesian school, innate ideas have a "logical" rather than a "psychological" significance, though Descartes did not always make the distinction sufficiently clear. Leibniz in his polemic against Locke, insisted more expressly on this distinction, and, by his insistence on it, was the first to put forward "theory of knowledge" as a philosophical doctrine independent of psychology. Both Descartes and Leibniz had at the same time attempted a psychological defence of their common doctrine. Ideas, it was said, are present in the mind before experience "potentially" though not actually. Leibniz therefore professed, along with logical "apriorism" a form of psychological "nativism". Kant went beyond this point and effectually established "apriorism" as a theory of knowledge without mixture of psychology. Knowledge, he held, can only be explained in virtue of *a priori* elements, "logical" and not "psychological". What philosophy needs is an "epistemological hypothesis" showing how certain "transcendental" elements, as they may be called, since they are not discoverable in experience, but are necessary to constitute it, can explain knowledge, which cannot be explained without them. Such an epistemological hypothesis is furnished by the Kantian system.

The distinction between psychology and logic, it may be at once conceded to Dr. Koenig, is a very important one. But is it applicable in the particular way he here contends for? Are not all elements in "knowledge" elements in mind, and, as such, part of the subject-matter of psychological science? It may be said that "psychological" elements become "logical" when they are either naturally in conformity with, or are voluntarily brought into conformity with a certain intellectual "norm": but they do

not for that cease to be psychological; and the bringing of them into conformity with a norm is itself a psychological process. Dr. Koenig even is disposed to find in Prof. Wundt's "apperception" the intellectual "activity" that contributes the *a priori* element in knowledge. This, he supposes, may turn merely "associative" into "logical" processes. But "apperception," if it exists at all, is a psychological phenomenon just as much as the mere associative process to which it is supposed to add itself.

These remarks have reference to Thought in general rather than to the special question of Cause. When we turn to this, the point becomes still clearer. Every *a priori* theory of Cause consists essentially in the attempt to show that there is some mental (that is, psychological) element in the conception, to the mere nature of which belongs the conferring of logical validity. That this is the case with an *a priori* theory such as that of Maine de Biran—"the French Kant"—Dr. Koenig admits. Here the causal conception is derived from experiences of volition; in these experiences causal efficiency is supposed to be known directly. Dr. Koenig's criticism is that, although this theory of the causal conception may be true as a theory of its psychological origin, the validity of the law of causation is not thereby proved. But, in Kant's own theory, is it otherwise than by leaving the conception of mental "activity" quite vague that the appearance comes of introducing into the mental life something that is not "psychological" at all, but purely "logical"? If an accurate expression is desired for the "*a priori* elements in knowledge," where can this be looked for but in a determination of them by psychological analysis?

"Apriorism" it is clear, needs a psychological basis as much as experientialism. Experientialism, on the other side, can employ the distinction between logic and psychology for the vindication of scientific knowledge just as much as "apriorism". It was in part the mixture of psychological with logical points of view which, in Hume's theory of Cause, gave the experiential doctrine its sceptical colouring. To have shown this, according to Dr. Koenig, was a considerable portion of Kant's service. Now if, in reference to the conception of cause, Kant had simply pointed out this distinction, and for the rest accepted Hume's doctrine, his position would have been pure experientialism. Unless his "apriorism" can deal more effectively with the sceptical view of Cause than by a distinction which the experientialist can also make, it seems, from the logical point of view, a superfluous addition.

While taking from Hume the conception of causation as a particular kind of sequence, Kant, in Dr. Koenig's view, made it possible, as it is not for the pure experientialist, to regard causation as "necessary"; and this he was enabled to do by his philosophical "hypothesis". In this hypothesis consisted his material advance on Leibniz. While Leibniz had assumed a merely "analytic" function of the mind, Kant assumed an original "synthetic" function. "Synthetic knowledge *a priori*," made

possible by this function, is found first of all in mathematical axioms; but the synthetic function of the mind contributes also an element to the conception of Cause. Into the question of mathematical axioms and its solution on experiential grounds it is not necessary to enter. The question of Cause is what we have specially to deal with; and it can be treated separately. It may be admitted that the clear distinction of mathematical axioms, under the provisional designation of "synthetic judgments *a priori*," from formal inferences on the one side and from a *posteriori* knowledge of natural processes on the other, was a very important step in theory of knowledge, and constituted a definite problem for experientialism; and yet it may be contended that the special Kantian apparatus has done nothing for the problem of Cause. To decide upon its value here, let us see first more precisely what can be done by experientialism. Dr. Koenig himself provides us with material for the decision.

The causal axiom, in his view, is essentially an assertion of "invariable and unconditional sequence". This view he finds with greater or less perfection in Hume, Kant, Schopenhauer, and Mill. To Hume he ascribes the first quite definite determination of the causal problem; to Kant the banishment of Hume's scepticism by means of the *a priori* doctrine; to Mill the statement of accurate criteria by which causal connexions may be distinguished from connexions that are not causal; and to Schopenhauer an anticipation, mixed with some inconsistencies, of the special form taken by phenomenism in Mill's view of Cause. Against Mr. Spencer and others, he urges that the causal axiom, as applying to sequences, cannot be deduced from any law of "persistence" or "conservation". The law of conservation of energy does not tell us what other form of energy will emerge as the result of the disappearance of energy in one form; it only tells us that the quantity will remain unchanged. Phenomena may involve the presence of the same quantity of energy and yet be qualitatively different. The law of conservation, therefore, does not necessarily imply that the same cause has always the same (qualitative) effect. But this is required by science, and is asserted by the causal law in its ordinary form.

In recent times, the establishment of the principle of conservation of energy has helped to bring back the view of cause and effect as "identical". A "law of identity" of cause and effect, in the sense of quantitative equivalence, might perhaps be allowed if it were not for the tendency to regard it as deducible from the logical law of the same name. Dr. Koenig, in complete accordance with experiential principles, shows the impossibility of any such deduction. The Heraclitean doctrine of "absolute becoming", as it is well said in a quotation he makes from Lotze (ii. 167), cannot be refuted by the logical law of Identity; "for this only asserts that *m* is *m* in case it is, and so long as it is, but whether it is, and whether it must always be if it is once, upon those points the law decides nothing". A physical "law of

identity," in short, is an assertion about real existence, and no one can be forced to admit it by the mere requirement of intellectual consistency. In this respect—that is to say, in being a material and not a purely formal principle—it is entirely on the same ground as the law of causation of successive events.

This view in its general sense, an experientialist must accept. Yet perhaps rather more significance ought to be assigned to laws of Conservation than Dr. Koenig allows. It may be conceded that such laws are not by themselves sufficient to express the Uniformity of Nature in its full meaning; yet they are the most stringent expressions of that principle. A physical "law of identity" has even a certain special force against the sceptical view of causation. The scientific statement of it is more easily detached from any psychological account of the way in which it was arrived at, than is the law of successive events. To show how we come to believe that "every event has a cause," and how our belief might be determined even if the proposition were not true, seems to throw doubt on the truth of the proposition itself. The causation of successive events is undoubtedly capable of scientific interpretation as Mill has shown; and it is indispensable scientifically: but the popular origin of the belief in causation clings to it. A law of conservation is not only more easily viewed with regard simply to its truth or falsehood, but also, if we seek for its origin, we find it in the first impulses of speculation rather than in the "customary conjunctions" of common sense.

Up to this point, what Dr. Koenig lays down, and what has been said by way of objection or supplement, is all on the ground of experientialism. The position that can now be stated is this. Psychologically, either the view of Hume or of Maine de Biran as to the origin of the belief in causation might be accepted, and the truth of the causal law would neither be proved nor disproved. The belief may have its root in experiences of volition, or it may spring simply from observations of external sequences. In either case, the law of causation is to be affirmed not because of its origin, but because it is an indispensable postulate of scientific investigation, and is constantly verified and never contradicted by duly tested experience. Nevertheless, it must be admitted that there remains always for the experientialist the logical possibility of an exception to it. This is much insisted on by Dr. Koenig; and he apparently regards it as the great logical difficulty passed on from Hume to Kant, and not to be solved except by the Kantian "apriorism".

There is of course no absolute inconsistency between this view and the admission, which Dr. Koenig makes, that the form of temporal succession, asserted by Kant as the "schema" of Cause, cannot be deduced on Kantian principles; or at least that the deduction of it is a gap which no Kantian has yet filled up. For "apriorism," in Dr. Koenig's interpretation, does not profess to assign even the *form* of the causal connexion without an appeal to experience. By this interpretation, one great difficulty of

Kantianism is undoubtedly avoided. A more serious difficulty, however, remains. For it seems as if, when the "synthetic unity of apperception" has once conferred "necessity" of thought, no scepticism as to the strict universality of the causal connexion ought to be any longer possible. Yet, for Dr. Koenig, it is not only possible but legitimate. The position of Lotze, that absolutely "new" causes are from time to time introduced into the world, is, he says, for the Kantian as well as for the pure experientialist, irrefutable. Where then is the gain for the Kantian? Is the Kantian position, thus interpreted, even self-consistent?

In any attempt at solution of the logical difficulty put by the sceptic, Kantianism would have to proceed on precisely the same lines as experientialism. Even for the theoretical sceptic as to universal causation, there may, as Hume showed, be no grounds for holding the uniformity of nature to have ever actually been interrupted. Further, if we desire a consistent metaphysical doctrine, we may be impelled to an absolute determinism carrying with it uninterrupted uniformity of nature as a corollary. A metaphysic like that of Lotze may be rejected because it does not give intellectual satisfaction. The adherent of Kant's theory of knowledge has here exactly the same arguments at command as the experientialist; but he has no advantage.

Two points may now be selected where the Kantian influence seems to have made Dr. Koenig take up a more uncertain position than he would otherwise have done. The first is as to the relation of mind and body. Psychological causation and physical causation, he would feel himself obliged to hold, must be treated as unbroken and without mutual interference, if it were not for the "activity of apperception". This he takes as a fact, and finds to be the only fact inconsistent with a denial of "psycho-physical" causation, or the production of physical effects by a psychical activity that has no organic correlate. Isolated as it is, the fact cannot be denied; for it is required to explain the "intrinsic constraint" from which comes the peculiar necessity of *a priori* truths. With some other writers, he accordingly finds it an advantage in Hume's and Mill's theory of Cause that "psycho-physical" and "physico-psychical" causation are not excluded on principle. There is, it may be allowed, in the denial of any real break either in the series of mental or physical causes a reassertion of an old rationalistic position. The experiential philosopher, however, has no difficulty in modifying Hume's or Mill's thought to this extent. The Kantian "apriorism," on the contrary, has introduced a special difficulty, as we see. To Dr. Koenig this difficulty appears so great that it leads him to reject what he admits to be otherwise the most consistent view, and the view best supported by experience.

The second point is as to the form of idealism to be adopted. Dr. Koenig holds firmly to the Kantian "Transcendental Idealism". This idealism, he acknowledges, has something in common with "Transcendental Realism"—the distinctive point

of which is to retain in a more or less attenuated form the belief in an existence that is nothing if not "objective," and that yet has a reality apart from its relations to all subjects. In common with this doctrine, it refuses to resolve "the object of the naïve realist" into "mere representations". It recognises the rights of "empirical realism" against "empirical idealism". In other words, Dr. Koenig, like most Kantians, stops short of the consistent idealism arrived at on experiential grounds. The connexion of "apriorism" with this inconsequence is evident when he admits that Kantianism involves a difficulty never yet solved—and which he himself does not profess to solve—in the "coincidence of the empirical (corporeal) with the transcendental subject". For a thoroughgoing idealism this difficulty does not exist. When idealism is held quite consistently, the "corporeal subject" (as it has been put) is purely phenomenal. On the common ground of an idealistic and experiential theory of knowledge, different metaphysical doctrines may be arrived at; but the particular difficulty of accounting for the manifestation of a "transcendental subject" in a material organism has disappeared. Dr. Koenig's own view, except at certain points, is consistently phenomenist. His lapses into realism are clearly due to over-strict adherence to Kant.

Generally, there is more in Dr. Koenig's book for an experientialist to agree with than to disagree with. No attempt has been made to convey an idea of his full and careful examinations of particular thinkers. It can only be said that his exposition is of sustained excellence; being everywhere clear, impartial and appreciative. The result of the whole is to display one thing especially; and that is the steady philosophical advance that has been made in the discrimination of scientific conceptions and in the interpretation of natural law. To show this, no schematic arrangement of thinkers according to a theory of the historical movement has been necessary. When, in the first volume, Dr. Koenig places the Continental rationalists in a series by themselves, then the English experientialists, and lastly Kant (with Reid interpolated), he simply follows the traditional order without intending to maintain that either series is a wholly separate movement uninfluenced by the other. Indeed, he remarks that one of the few cases of strict "continuity" that the history of philosophy presents is the discussion of mental "relations" by Hume, Kant and Herbart. The typical example of philosophical continuity is, with him, the succession from Locke, through Berkeley, to Hume. This absence of any attempt at exact historical arrangement of thinkers in a line of development makes the advance that the reader may see in the whole movement, and the continuity of the movement in a certain sense, more impressive. Perhaps it ought to be added that—as Dr. Koenig has borne in mind—a condition of perceiving the development is to keep in view especially the philosophy that has been in some kind of contact with science. This does not seem unreasonable when that which is in question is the logic of scientific thought.

THOMAS WHITTAKER.

VII.—NEW BOOKS.

[These Notes (by various hands) do not exclude Critical Notices later on.]

Philosophy and Theology. Being the First Edinburgh University Gifford Lectures. By JAMES HUTCHISON STIRLING, LL.D. (Edin.), &c. Edinburgh: T. & T. Clark, 1890. Pp. xvi., 407.

These Lectures do not come up to expectation. They are the first complete (two-years') Gifford course yet printed; Professor Max Müller's *mélange* of more than a year ago (see MIND xiv. 593) standing for only half of the first Glasgow course. Edinburgh had taken care to secure for first discharge of a philosophic task the services of an acknowledged expert; and nobody, of whatever way of thinking, can have looked forward without extreme interest to Dr. Hutchison Stirling's deliverance on any part or aspect of the appointed subject of Natural Theology. Nor, in choosing for his special topic the historical development of the "proofs" for the existence of God, does Dr. Stirling fail to say, of course, many a notable and well-pointed thing, or at times, as in regard especially to Aristotle and Kant, to broaden out into general philosophical delineation with a power all his own. But the Lectures, as a whole, sin by great irrelevance. Only twenty of them altogether, they were none too many for effective treatment of a subject requiring just the proved philosophical ability and comprehensive historical knowledge of the lecturer. One cannot, then, too much deplore the waste—for such a course—of so much time and space on effusions of the good Lord Gifford himself; on mere literary performance of Carlyle, Emerson, and the like; on general talk about Hume that almost overbears what has to be said of Hume; or on the *Darwiniana* and other *ana* that keep Dr. Stirling, through as many as four lectures, from ever closing with philosophic grip upon "Darwin and Design". The reason of such misfortune? Evidently, it is nothing else but some unhappy fancy of the lecturer that he must above all keep tickling the ears of mixed audience. Professor Max Müller could do that at Glasgow without effort, by virtue of a naturally episodic style. Without or with effort, if it is to be the manner of Gifford Lectures,—one can but say that the prospect for Scotland is not good through all the years that must, in decency, pass before the Charity Commissioners lay reforming hands on the rich foundation. Dr. Stirling sets out to deal with "the proofs" on the affirmative side in the first half of the course, and in the second half on the negative side. The "affirmation," except for incidental references to some moderns, is carried no farther than down to Anselm, with whom in the 11th century the ontological proof is held to have first and at the same time finally emerged, after the cosmological and the teleological had already found adequate expression from the ancients, notably Aristotle and Cicero. The "negation" is made to begin with Hume, and is then traced through "comparative and superlative degrees" in Kant and Darwin; "it being only," says the lecturer (p. 219), "since Mr. Darwin that, as the phrase goes, atheism has set in like a flood". Passing by a rhetorical exaggeration of this kind, the more as it is fairly balanced by another such remark (p. 221), that "after Pericles, indeed, irreligion and atheism became in Greece rampant,"—what strikes one in the general division of the subject is the artificial character of it, by way of mere time. And Dr. Stirling is so little unconscious of this himself that he is careful to add at once, on p.

219, that neither is the modern world "to be considered exclusively or predominatingly negative," nor the ancient "exclusively or predominantly affirmative". But that being so, it seems a pity that we do not hear more of the *grounds* of ancient negation, or at least more of the phases through which the later affirmation has passed. However it be with the name 'Natural Theology,' which in its accepted sense may be not older than Raymund of Sabunde in the 15th century, there was too much theistic argument throughout the Middle Age (after Anselm), and too original and varied a presentation of the "proofs" in modern times from Descartes onwards, to leave it at all satisfactory that Dr. Stirling should leap straight from Anselm after the ancients on one side over to Hume on the other. And even from Raymund's laying-out of Natural Theology in the later days of Scholasticism, the reminder might have been taken that besides the three rational proofs, which Kant riddled with criticism, there is the other so-called 'moral proof,' adopted by Kant himself, which, as much as the ontological (at least), deserves the name of 'natural'. It is one of Dr. Stirling's rather surprising omissions to take no express account of this, either on the affirmative or on the negative side: his ardent advocacy of the other proofs, most of all the ontological, need not in the least have suffered by extension of his view to the particular argument which, in modern times, has gained more and more the upper hand with believers. In Dr. Stirling's own philosophical attitude as now disclosed, what is otherwise most noteworthy, perhaps, is his declared sympathy not only with Aristotle over Plato, but with men like Bacon and Newton for whom Hegel had so little esteem. On Hegel himself, at least when occupied with Philosophy of Religion, there is at p. 188 a judgment passed of rather curious severity.

The Principles of Psychology. By WILLIAM JAMES, Professor of Psychology in Harvard University. 2 Vols. London: Macmillan & Co., 1890. Pp. xii., 689; vi., 704.

This long-expected treatise, though it saw the light some weeks ago on the other side of the Atlantic, has come to hand upon this side only just in time not to fail of mention here. It will of course be duly subjected to detailed Critical Notice, as soon as its freight of matter, great as well as rich, can be sufficiently grasped. An equable treatment of all the main topics of psychology, it does not supply. The author himself notes the enforced omission of pleasure and pain and of the moral and æsthetic feelings and judgments; while others may remark, at a glance, something of haphazard in the selection and ordering of the topics that are discussed. The first glance, however, discovers also a great 'actuality' in the treatise. Hardly any of the topics is other than of pressing interest at the present stage of psychological advance; and most of them are handled with that close regard to the particular facts of experience without which no farther real advance is possible. This particularity of treatment is, perhaps, most beneficially apparent in the long chapter on "The Perception of Space" (ii. 134-282), known in first draft to the readers of *MIND* since 1887. There is no other discussion of this topic in English that comes near in point of full comprehensiveness to Prof. James's. In its revised form, his theory of space-perception has now the advantage of appearing in its natural surroundings; and the interesting question for those to whom, in spite of all its elaboration, it did not prove convincing before, will now be to see whether it is sufficiently strengthened by its proper accompaniments. However this may turn out, of the human interest which Prof. James has the power of giving to the discussion of this and every other psychological topic, there can be

no question. Readers he could not fail to have—of the continuous, as well as of his “skipping” (say rather, referring), sort—though he had made his volumes even bigger than they are.

Handbook of Psychology. “Senses and Intellect.” By JAMES MARK BALDWIN, M.A., Ph.D., Professor of Logic and Metaphysics in the University of Toronto. Second Edition, revised. London: Macmillan & Co., 1890. Pp. xv., 343.

Also from America comes this psychological text-book, now in second edition made more accessible, by London publication, to English students. It was shortly noticed, on first appearance at New York, in *MIND* xv. 188. Only a few lines of new matter are inserted in the present edition; but the opportunity may be seized to recommend the book with some more emphasis than before as a very serviceable manual for students. It is also due to the author to say that he came too near to being charged here with a design of intuitionistic philosophising under psychological mask. Though he might use newer bottles than he here and there does for his new wine, he is not unwarranted in claiming now, as he claimed from the first, that his business is scientific psychologising—only not without regard to the requisite philosophical interpretation beyond. For students, the most—perhaps the only—obvious shortcoming of his treatment is the absence of any direct exposition of the neurological conditions of mental process. Without such, in more or less condensed form, the student has good right to complain of the anatomical and physiological language inevitably thrust upon him at the stage of Sense, if not also elsewhere. Nor is the omission in any way made up by a figure of the outer and mesial aspects of the cortical “motor area,” now given as frontispiece to the book in connexion with the few additional lines inserted, at p. 114, about localisation of brain-function. Not that, unless a good deal more! one is forced to exclaim. The author’s promised volume on “Feeling and Will” is, of course, wanted to make the present volume fully serviceable.

Are the Effects of Use and Disuse inherited? An Examination of the View held by Spencer and Darwin. By WILLIAM PLATT BALL (“Nature Series.”) London: Macmillan & Co., 1890. Pp. xii., 156.

This book, though small and not closely printed, is well filled with matter. The author argues against the Lamarckian doctrine of “use-inheritance,” defined as “the direct inheritance of the effects of use and disuse in kind”. After setting forth the “Importance and Bearing of the Inquiry” he goes on to deal first with Mr. Spencer’s “Examples and Arguments” contained in *The Factors of Organic Evolution* (see *MIND* xii. 293). “Darwin’s Examples” are next considered; the question of “Inherited Injuries” is then separately treated; and the book ends with some “Miscellaneous Considerations”. Account being taken of “panmixia, or the withdrawal of selection”; of “the great principle of economy, which is continually at work shaping organisms, as sculptors shape statues, by removal of the superfluous parts”; of “unconscious or indirect” artificial selection, the possibilities of which, in the case of domestic animals, have not been sufficiently considered; and of the direct effects of use and disuse during the lifetime of the individual; further, the consideration being kept in view that, “broadly speaking, the adaptive effects ascribed to use-inheritance coincide with the effects of natural selection”; there can be little ground, the author thinks, for upholding use-inheritance as a distinct factor of evolution. The

hereditary consequences of mutilations and diseases are due to direct morbid actions upon the reproductive elements of the organism, rather than to changed functions influencing these. Such consequences are, for the rest, exceptional. Parental modifications in general, as is required by Galton's and Weismann's theory of heredity, "are irrelevant to those transmitted to offspring". There are also positive difficulties in the way of admitting use-inheritance. The result of the whole is well formulated at p. 95: "Use-inheritance appears to be so relatively weak a factor that probably neither proof nor disproof of its existence can ever be given, owing to the practical impossibility of disentangling its effects (if any) from the effects of admittedly far more powerful factors which often act in unsuspected ways". The author has had in view the social bearing of the inquiry; in relation to which his general conclusion runs thus: "The effects of use and disuse—rightly directed by education in its widest sense—must of course be called in to secure the highly essential but nevertheless *superficial, limited, and partly deceptive* improvement of individuals and of social manners and methods; but as this artificial development of already existing potentialities does not directly or readily tend to become congenital, it is evident that some considerable amount of natural or artificial selection of the more favourably varying individuals will still be the only means of securing the race against the constant tendency to degeneration which would ultimately swallow up all the advantages of civilisation". Applications are only briefly and rather superficially touched upon; but the essay maintains its scientific interest to the end, and the general bearing of the theory of heredity on social action could not be better pointed out.

Animal Life and Intelligence. By C. LLOYD MORGAN, F.G.S., Professor in and Dean of University College, Bristol, &c. London: Edward Arnold, 1890-1. Pp. xvi., 512.

A "consideration of Animal Intelligence, from the scientific and philosophical standpoint". On the scientific side, the author has found it necessary to go back upon a consideration of Organic Evolution in general, especially in view of the recent work of Weismann and other biologists. The question of Intelligence in animals is not reached till the second half of the volume. It is then treated under head of—their Senses, their powers of Perception and Intelligence, their Feelings (Appetences and Emotions), their Activities (Habit and Instinct); with a chapter (viii.) interpolated on "Mental Processes in Man". Finally, ch. xii. is occupied with the author's philosophical interpretation of "Mental Evolution". Readers of MIND (xi. 174), had evidence years ago of Prof. L. Morgan's effective interest in "The Study of Animal Intelligence". Critical Notice will now follow of the present more definitive result of his studies.

Proceedings of the Aristotelian Society for the Systematic Study of Philosophy. Vol. I., No. 3 (pt. 2). London: Williams & Norgate [1890]. Pp. 77-165.

Some notes by the late Miss Naden, three papers (on Society and State, on Herbert of Cherbury, and on Beauty), and two "Symposia" (on the Relation among the Fine Arts, and on the Distinction of Feeling, Cognition and Conation, with three interlocutors in each case), make up the present issue. One is more struck by the variety of philosophic topics here taken up by the Aristotelian Society than, so far as appears, by anything particularly "systematic" in the study of them. The most

notable of all the pieces given is Mr. G. F. Stout's independently grounded acceptance of the tripartite division of Mind (pp. 142-50): in the end he is in such "substantial agreement" with Prof. Bain that the latter, who closes the discussion, contents himself with little more than an accentuation of the fact.

Life of Arthur Schopenhauer. By W. WALLACE, Whyte's Professor of Moral Philosophy, Oxford. London: Walter Scott, 1890. Pp. x., 217.

This volume, belonging to the "Great Writers" series, interweaves critical appreciation with biographical narrative in a very skilful way. The distinctive conditions of life and resulting aims that mark off Schopenhauer among German thinkers are impressively indicated in a first chapter, and then, after two others mainly biographical, *cc. iv., v.* (pp. 89-137) are devoted to the great philosophic work which he produced at the age of 30; while, in the remaining two chapters, biographical interest is sustained by free reference to the self-disclosures made in the occasional essays of later life but most of all in the variegated *Parerga u. Paralipomena*. There should be no need now to go beyond what Professor Wallace has written for a general understanding of the philosopher's life and character. The Bibliography (by Mr. J. P. Anderson) given at the end, according to the rule of the "Great Writers" series, is admirably full.

Studies in Pessimism. A Series of Essays, by ARTHUR SCHOPENHAUER, selected and translated by T. BAILEY SAUNDERS, M.A. London: Swan, Sonnenschein & Co., 1891. Pp. 142.

This is the fourth volume of selections (the others noted in MIND vols. xiv., xv.) which Mr. T. B. Saunders has been happily making from the *Parerga u. Paralipomena*. It includes ten pieces, of which the more notable are "On the Sufferings of the World," "Further Psychological Observations," "On Education," and "On Women". The translation runs uncommonly well. Readers of Prof. Wallace's *Life* cannot do better than supplement it first by turning to Mr. Saunders's handy volumes.

The Development of Theology in Germany since Kant, and its Progress in Great Britain since 1825. By OTTO PFLEIDERER, D.D., Professor of Theology in the University of Berlin. Translated under the Author's supervision by J. FREDERICK SMITH. London: Swan Sonnenschein & Co., 1890. Pp. xii., 403.

This work by the well-known Berlin Professor has been written (in German) expressly for "The Library of Philosophy," inaugurated last year by the translation of Erdmann's *Grundriss der Gesch. der Philosophie* (see MIND xv. 132). It appears in English before the German original; and, to judge by the general style, the exceptional pains taken with the rendering, by author and by editor (Mr. J. H. Muirhead) as well as by translator, has had very satisfactory result. (This is more, by the way, than can truly be said of the translation of Erdmann, which a closer inspection has shown to be not a little defective in that most important division occupied with "Modern Philosophy from Kant to Hegel's death".) The work is disposed into four parts: (1) The Basis of Modern Theology in German Idealistic Philosophy; (2) The Evolution of Dogmatic Theology under the Influence of Idealistic Philosophy; (3) Biblical and Historical Theology; (4) A Survey of the Progress of Theology in Great Britain since 1825. The fourth part (pp. 308-401),

which seems very well and comprehensively done, has a special interest for the English reader. It includes a large amount of general philosophical reference; while the first part (pp. 1-82) may be called strictly philosophical. Critical Notice will follow.

The Ewe-speaking Peoples of the Slave Coast of West Africa: Their Religion, Manners, Customs, Laws, Languages, &c. By A. B. ELLIS, Major, First Battalion West India Regiment; Author of *The Tshi-speaking Peoples of the Gold Coast, &c., &c.* London: Chapman & Hall, 1890. Pp. viii., 381.

After his remarkable volume, *The Tshi-speaking Peoples of the Gold Coast* (see MIND xiii. 291), Major Ellis now proceeds to give an equally thorough and original account of the more organised communities dwelling eastwards of them on the "Slave Coast". Of these the chief is Dahomi, the history and institutions of which fill a large space in the book. Interesting as are the descriptions of the political, military, religious and domestic regulations of that highly organised savage kingdom, the anthropological interest is still greater where the more inchoate phases of development of negro beliefs and customs are dealt with. In the present volume what is most noteworthy is the account of the way in which "local deities" develop into "general deities". Communications being easier, and the priesthood having consequently become better organised than among the Tshi-speaking peoples, the priests have blended local gods of similar attributes into a general god everywhere represented by the same image and served with the same ceremonies. The general deities thus formed become independent of any tangible abode, and indeed "to all intents and purposes omnipresent". This change was probably promoted by the priests' having represented that the god entered the image, before which, consequently, sacrifice and prayer might be made instead of in the actual habitat of the god. The tie between the god and his habitat having been thus weakened, the notion of the god as an "indwelling spirit" has become obscured. Amulets also are no longer thought to derive their special properties from an indwelling spirit communicated to them. They are therefore no longer, as among the Tshi-speaking peoples, the "tutelary deities of individuals," but are simply tokens consecrated to a god. Still the notion of gods as indwelling spirits has not disappeared; being kept alive by the many local deities, exactly like those of the Gold Coast, which remain, though in a depressed state. Next above these local deities are the "tribal deities" worshipped by one or more tribes. Highest in order are those that the author names pre-eminently "general deities"—*viz.*, those worshipped by the Ewe-speaking peoples as a whole. The highest of all, though "not a supreme being or creator," is Mawu, "the indwelling spirit of the firmament". By the natives and by some missionaries there has been a "blending together of Mawu and Jehovah". The supposition that Mawu is derived from what the natives have heard from the missionaries, Major Ellis is disposed to regard as an error; and he goes on to say that, from additional evidence since collected, he thinks the view he formerly expressed concerning the origin of Nyankupon, the parallel god of the Tshi-speaking peoples, was incorrect. Instead of his being "the Christian God, borrowed and thinly disguised," Major Ellis now holds that "he is, like Mawu, the sky-god, or indwelling spirit of the sky; and that, also like Mawu, he has been to a certain extent confounded with Jehovah". The conception of an "indwelling spirit," first formed in the case of man and then carried over to all natural objects, is, as Major Ellis previously argued, the starting-point of negro conceptions

of deity; and this view is confirmed by his later investigations. The religion of the communities of the Slave Coast is simply a more developed nature-worship, and is not derived from ancestor-worship, but proceeds in a direct line from animistic conceptions of objects. Ancestor-worship, however, is met with in Dahomi, as in Ashanti, and there have been noted four distinct "instances of the deification of men by the eastern Ewe tribes, of which we have no example either on the Gold Coast or amongst the western Ewe tribes". In no case, however, "has the fact that these demi-gods were formerly men been lost sight of". Two of the persons deified (both kings) were of maleficent attributes during life; the remaining two are worshipped as benefactors of mankind. Among the Yoruba-speaking peoples (farther east)—to whom the author hopes to devote a separate volume—ideas of metempsychosis have developed; and these have to some extent influenced the more easterly of the Ewe-speaking tribes. When these ideas appear, legends of the origin of gods begin to spring up; the explanation of a deity as the indwelling spirit of a particular object, present in it as long as it has existed, being no longer found sufficient.

Theory of Physics. A Rectification of the Theories of Molar Mechanics, Heat, Chemistry, Sound, Light, and Electricity. By CAMILO CALLEJA, M.D. London: Kegan Paul, Trench, Trübner & Co., 1890. Pp. xvi., 245.

This "Theory of Physics" is preliminary to a "Universal Physiology" or "whole abstract knowledge of nature". The author's aim now is to reduce all propositions regarding motion to forms of the law of Conservation of Energy; this being "the sole fundamental principle of molar movements as it is of universal dynamics". In relation to the general system of things the conservation of energy is subordinate. "Matter is not capable by itself alone of producing any change, the continuity or persistency of Cosmos in its uniform actual state depends on the Supreme Power which directly acts upon organism alone. Therefore our general view may be embodied in the following proposition: *The Universe is an organism in which no other true agent or cause but the Creator acts, and the primordial change effected by the Creator is solely and continuously produced upon living matter*; thus the activity of life becomes the proximate cause of all changes of organic matter, and from this arises the manifested or phenomenal uniformity of the cosmic system." Apart from interpretations of physical and chemical laws, there are some suggestions as to the way in which the idea of an "organic system of the universe" is to be connected with that of "cosmic mechanism"; but for their working out we must wait till the "Universal Physiology" comes to hand.

Belief in God: Its Origin, Nature and Basis. By JACOB GOULD SCHURMAN, Sage Professor of Philosophy in Cornell University. New York: Charles Scribner's Sons, 1890. Pp. x., 266.

Six lectures, entitled (1) Agnosticism, or the Impossibility of Belief in God, (2) The Logical Character of Belief in God, (3) The Origin and Development of Belief in God, (4) Belief in God as Cause or Ground of the World, (5) Belief in God as realising Purpose in the World, (6) Belief in God as Father of Spirits. "A theism based on the facts of the cosmos, or universe, is called *cosmic*. To the universe we oppose man; and a theism based on facts of human nature might very properly be called *anthropic*. A theism resting on this double ground I call *anthropocosmic*; and I choose this combination rather than *cosmoanthropic*, to

indicate that, while mine is a man-universe theism, man must not be interpreted in terms of the universe, but the universe in terms of man; namely, of that self-conscious spirituality which makes us selves and persons. Anthropocosmic theism is the doctrine of a Supreme Being, who is ground both of nature and of man, but whose essence is not natural but spiritual."

The Ethical Problem. By Dr. PAUL CARUS. Chicago: The Open Court Publishing Company, 1890. Pp. xv., 90.

Every system of ethics, whether philosophical or religious, being based upon some conception of the world, the present three lectures "delineate a system of ethics which is based upon a unitary conception of the world". This ethical system, already set forth in the author's *Fundamental Problems* (see MIND xv. 137) is here insisted on against what he considers the too great eclecticism of the new Societies for Ethical Culture. There can be no "ethical" agreement, he thinks, without agreement in theoretical philosophy. The true ethics and philosophy must be based on science. New as a philosophical system, the scientific ethical doctrine is not new in what it practically teaches. "We want new ethics but no new morality. The morality of the old religions is not wrong." Its defect is only to have based morality on the wrong arguments—*viz.*, supernatural sanctions. When these have lost their force, it is necessary—if morality is to be retained, not as a mere habit, but as rationally directed conduct—that their place should be supplied by others; and for this a theory is required.

A Theory of Conduct. By ARCHIBALD ALEXANDER, formerly Professor of Philosophy in Columbia College. New York: Charles Scribner's Sons, 1890. Pp. 111.

This short essay is evidently intended rather as an effort to clear the ground or lay the dust of ethical speculation, than as a substantive or systematic contribution to the subject. Its purpose is "to discuss as concisely as possible some of the more important principles which are the foundation of all moral science," and "in setting aside much that is false, to arrive at conclusions which are beyond doubt". "It is also my purpose to notice briefly the harmony of moral science and revealed religion." The author's position may be described as Hedonism, 'with a difference'. The form of the hedonistic theory which he adopts as the only logical one is the Egoistic. In opposition to what he terms the "hypocrisy" of both altruistic hedonists and intuitionists in their dealing with the motives of conduct, he holds that "it is impossible to persuade men to seek after the happiness of others unless they are convinced that such conduct will secure their own happiness". The distinction of 'quality' in pleasures is also disallowed. While, however, "Egoism is a necessary faculty of the human mind, the history of society shows very plainly that duty, too, is necessary". And "duty is independent of Egoism. For even if it be claimed that all moral conduct is Egoistic, it must be borne in mind that Egoistic conduct is only the conduct of duty, and not a necessary part of the conception of duty as such." This conception of duty or obligation is, as it were, the form of moral life which, while itself primary and necessary, depends for its content upon the teachings of experience. "That I ought to do my duty is a necessary proposition. The content of duty is various and accidental. . . . Like some mysterious oracle, it calls on men to act, but does not tell them what to do." "This I conceive to be the relation subsisting between the *That* and the *What* of morality." But even with the aid of such an

intuitional or transcendental basis, "the logical result of Egoistic hedonism is pessimism". The Egoistic motive is that which corrupts our society. The mass of men, if their motives be selfish, will pursue a course of conduct which will be certain to end in unhappiness. "It seems to me, then, that from a purely scientific point of view, Egoism is the only logical course of conduct, and pessimism is its natural result." The only deliverance from the pessimism in which moral science ends is to be found, according to Mr. Alexander, in the Christian Revelation of the Incarnation and of Personal Immortality. The essay is packed with fresh and suggestive thinking, often expressed in beautiful and striking language. It is only too "concise".

Ethical Religion. By WILLIAM MACKINTIRE SALTER. Boston, U.S.A.: Roberts Brothers, 1889. Pp. iv., 332.

This book, consisting of lectures delivered to the Chicago Society for Ethical Culture, has already appeared in Dutch and German translations, the latter by Prof. Giżycki; see MIND x. 622.

L'Hypnotisme : ses Rapports avec le Droit et la Thérapeutique. La Suggestion mentale. Par ALBERT BONJEAN. Paris: F. Alcan, 1890. Pp. ix., 320.

This is a brightly written book, by a practising Belgian lawyer, who is also a deft hypnotiser and who, as such, has experimented with many human 'subjects,' both for relief of suffering and in the interest of science. If, in spite of his personal efficiency with patients, he speaks as a layman on the therapeutic topic, it is otherwise with his treatment of the legal aspects of hypnotism. Agreeing in his general interpretation of hypnotic phenomena with the Nancy school and with Prof. Delboeuf, he is yet forced, by a varied experience, to maintain against his distinguished fellow-countryman that hypnotic 'subjects' can certainly be made to yield to criminal or other illegal suggestions, and that hence there arises a most serious social danger that must be faced legislatively. The book (after a somewhat overstrained introductory address to a legal luminary in the Belgian world) is not only brightly written but also throughout originally conceived. It records many new and striking facts set in a frame of acute reasoning.

Philosophie de François Bacon. Par CH. ADAM, Professeur-adjoint de Philosophie à la Faculté des Lettres de Dijon, &c. Paris: F. Alcan, 1890. Pp. 437.

A critical exposition of Bacon's philosophy, which recently gained the Bordin prize from the Academy of Moral and Political Science. Exposition and criticism are alike very good and well-informed. The author has, for example, taken up and clearly expressed the right view as to Bacon's relation to the English "philosophy of experience" (see pp. 377-8; also 417-18). There is, as he briefly indicates, no regular order of filiation of English philosophers beginning with Bacon; the real order is quite different. Bacon's "influence" therefore reduces itself in the main to an influence on science. There was not, so far as scientific men were concerned, any very great actual influence of Bacon's ideas; but ideas which summed up the tendency of science at certain periods were found already expressed by Bacon, to whose authority those who represented the tendency could appeal. Bacon's greatest influence was in raising the credit of science in general opinion just at the time when it was beginning to be systematically pursued; that is, in the seventeenth century. In the eighteenth century he was less studied, but more appealed to; the name

of "Baconian" served as a badge to those who represented the prevailing distrust of "hypotheses" and "systems" and devotion to the collection and analysis of facts. In the present century the renewed effort after large hypotheses, and the more disinterested view of the aim of science, has brought on a reaction against Bacon; and scientific men, after praising him beyond measure, have treated him with the utmost contempt. The condemnation is less to be justified than the praise; for Bacon really promoted the cause of science, and belongs to its history more than he does to the history of philosophy.

Les Fondements de la Métaphysique. Par B. CONTA. Traduit du roumain par D. TESCANU. Paris: F. Alcan, 1890. Pp. 156.

This volume is principally the translation of an unpublished Roumanian manuscript, left incomplete by the author (who died in 1882) and intended as the introduction to a larger "Essay in Metaphysics". Some smaller fragments are added as an appendix. A former work of the author was noted in *MIND* ii. 433. Apparently his materialistic doctrine, there set forth, is still adhered to; but there are some interesting passages in which he not only contends for the "intellectual necessity" of a metaphysics, but also indicates more than one possible solution of final metaphysical problems. Any attempt to attain a unitary conception of things, he sees, must contain a subjective, or, as he calls it "artistic" element. And the greater the sphere of positive knowledge becomes, the more also will the field of imagination be enlarged. (See especially pp. 86-9.)

DR. ANTOINE CROS. *Le Problème.* Nouvelles Hypothèses sur la Destinée des Êtres. Paris: Georges Carré, 1890. Pp. vi., 295.

This book is marked by a certain eccentricity of form, but is not without distinctive philosophical interest. It is essentially an attempt at a monadological metaphysics, which the author does not omit to compare with the doctrine of Leibniz (note xv., pp. 264-270); but it has been independently thought out and has a character of its own. From the theory of an indestructible atom as the "domain of the soul" emerges a doctrine of personal immortality. The life of the soul under earthly conditions of experience is to be regarded as a state in which impressions are accumulated for the future exercise of "creative" power by "imagination," which the soul possessed before and will possess again during an indefinite series of deaths and reincarnations.

Contributo Critico-sperimentale alla Fisiopsichologia della Suggestione. Sui fenomeni di credulità per suggestione non ipnotica nelle persone sane. Per il Prof. ENRICO MORSELLI, Direttore della clinica delle malattie mentali nella R. Università di Genova. Milano: Fratelli Dumolard, 1890. Pp. 39.

A description of phenomena of "credulity" produced in normal and healthy 'subjects' by non-hypnotic "suggestion". The "suggestions" are classified into "sensory" and "motor"; the "sensory suggestions" being grouped under the heads "tactile and muscular," "olfactive," "gustative," "acoustic," "visual," and "organic and visceral" sensations. The exposition is intended to illustrate and support the doctrine of the Nancy school, to which, as the author mentions, he has from the first attached himself. "Suggestion" is to be exhibited as something common to hypnotism and to the most ordinary experiences.

ALESSANDRO CHIAPPELLI. *Sui Frammenti e sulle Dottrine de Melisso di Samo*. Roma: Tipografia della R. Accademia dei Lincei, 1890. Pp. 39.

The author argues against the unfavourable judgment of most modern historians on Melissus. The real position of Melissus was between the pure Eleatic and the Ionian directions of thought. More seriously and acutely than any other Eleatic, he discussed the possibility of a physics; and in the positive part of his doctrine he corrected and formulated with greater rigour the doctrine of Parmenides. The view, which has been put forth, that he affirmed the idealistic doctrine of an immaterial unity of being, cannot, however, be sustained. The Eleatic doctrine was always realistic in content; it was "idealistic" only in the purely "dialectical" procedure of its argumentations.

Prof. GIUSEPPE SERGI, della R. Università di Roma. *Psicologia per le Scuole*. Con 62 figure intercalate, espressamente disegnate ed incise. Milano: Fr. Dumolard, 1891. Pp. vii., 215.

A very effective exposition, for young learners, of the main topics of psychology, as conceived and treated by the author in his larger works (see MIND vii. 154, x. 474, xiii. 136). The point of view is frankly biological. On Pleasure and Pain and the Emotions, the author has been developing views which he considers new, and to these, here briefly sketched, he promises to give before long a more ample exposition.

Erkenntnislehre. Von Dr. AL. SCHMID, o. ö. Professor an der Universität München. 2 Bände. Freiburg im Breisgau: Herder'sche Verlagsbuchhandlung, 1890. Pp. vii., 498; v., 428.

A systematic and historical work on Theory of Knowledge, viewed as the fundamental philosophic discipline. Volume i. is principally historical and is divided as follows: "Introduction" (pp. 1-61); Section i. "Philosophical Doubt" (pp. 62-110), ii. "Sensible Knowledge" (pp. 111-242), iii. "Rational Knowledge; First, historical division" (pp. 243-498). Volume ii. contains the "Second, systematic division" of section iii., under the heads of (1) Rational Knowledge generally, (2) General metaphysical Rational Knowledge, (3) Metaphysical Knowledge of Nature, (4) Metaphysical Knowledge of Spirit, (5) Metaphysical Knowledge of God, (6) Logical Knowledge, (7) Ethical Knowledge, (8) Aesthetic Knowledge, (9) Critical Estimation of the Sensualistic and Intellectualistic Theories of Knowledge, (10) Rational Certainty, (11) Kinds of Rational Certainty, (12) Theories of Certainty; together with a brief conclusion on the limits of certainty. The author, as he tells us, stands at the point of view of a "*philosophia perennis*, which, growing with history, remains in essence always the same, and never grows old, because it continually renews its youth and consequently never outlives itself". Theory of Knowledge, from this point of view, begins with "a merely methodic doubt". To this kind of doubt it can submit all things, consciousness included, "without necessarily having to submit all the trans-subjective things that are valid for the common rational or pre-philosophical consciousness to a not merely probationary but serious doubt". Having got beyond "probationary, methodic doubt" to the establishment of a sufficient number of philosophical dogmas or certitudes, it can then mark the "limits of knowledge" and point out the place for theological dogmas and for the apologetic department of theology, to which is assigned the defence of these. The "ground-direction" of the book, the author says, will be sufficiently manifest from

its contents. The execution, in parts, appears not bad; though this is surprising at i. 28:—"The doctrine of the Scottish school, of a general reason- and belief-sense as criterion of certitude, was transmitted by James Mill, John Young, Douglas, William Hamilton".

Moralphilosophie. Eine wissenschaftliche Darlegung der sittlichen, einschliesslich der rechtlichen Ordnung. Von VICTOR CATHREIN, S.J. Erster Band: Allgemeine Moralphilosophie. Freiburg im Breisgau. Herder'sche Verlagsbuchhandlung, 1890. Pp. xv., 522.

This is the general part of a text-book of Scholastic Moral Philosophy. The Special Part, containing the application of general principles to particular cases, is to follow soon. The volume now published is very well written, and seems likely to be a standard exposition of the Neo-Scholastic doctrine in ethics. The point of view, as defined by the author, is expressly theistic, but not expressly Catholic or Christian. "We build," he says, "on grounds which every rational man, whether Christian or non-Christian, educated or uneducated, European or Asiatic, must recognise if his thinking be consequent". At the same time, "Moral Philosophy is the best apology of theism, and, with it, of Christianity". "Philosophy is the secure knowledge of things from their ultimate and highest grounds, so far as it is attainable with the natural light of reason. Moral Philosophy is that part of Philosophy which occupies itself with the moral order and strives to comprehend it from its ultimate grounds." Its chief source is "the secure axioms of natural reason". Moral precepts, as the author seeks to show at length in an Appendix (pp. 451-521) are and always have been in their most general outlines the same among all peoples, whether civilised or savage. Revelation, though not to be explicitly appealed to in order to establish philosophic principles, may nevertheless be taken by the moral philosopher as a "finger-post," since there are not two kinds of truth. Thus, it is not considered superfluous to point out that free-will, while it is proved by an immediate dictum of consciousness, is also part of Catholicism, and, as the author maintains, of Christianity (p. 33, note). Moral philosophy must start from positions already established in psychology or "anthropology". Positions necessary for ethics are the doctrine that man consists of soul and body, and the doctrine of free-will—the essential nature of which consists in this, "that the will, under the pre-supposition of all that is requisite for action, can proceed to the act or not". There is an objective, unchangeable standard of good and evil, determinable by reference to "the rational nature of man". The scientific system of moral philosophy, which determines objective ethical principles from the rational nature of man, has been constructed by S. Thomas on the foundation furnished by Aristotle. The ethical system includes in itself the system of law or right; exactly as the virtue of justice is included among the ethical virtues. The divisions of the present volume are, after a brief Introduction (pp. 1-10):—Bk. i., "Of the Nature of Man, and of Human Actions considered from their physical side"; bk. ii., "Of the destination of Man"; bk. iii., "Of the Norm of the Moral Good"; bk. iv., "Of the kinds and springs of the Moral Good"; bk. v., "The natural Moral Law"; bk. vi., "Conscience"; bk. vii., "Guilt and Merit"; bk. viii., "The doctrine of Right". The defence of the Scholastic positions against what are regarded as the most influential modern errors, and the counter attack on the views inconsistent with Scholasticism, are as elaborate as the direct exposition.

Zur Geschichte des Erkenntnissproblems. Von Bacon zu Hume. Von EDUARD GRIMM. Leipzig: W. Friedrich, 1890. Pp. xii, 596.

An exposition of the philosophy of Bacon (pp. 3-57), Hobbes (pp. 61-169), Locke (pp. 173-364), Berkeley (pp. 367-484), and Hume (pp. 437-596), with special reference to theory of knowledge. While recognising the independence of Hobbes with regard to Bacon and of Locke with regard to Hobbes, the author still finds that English experiential philosophy within the period considered may be compared to "a drama in five acts, which mounts upwards from Bacon and Hobbes to Locke, and after having performed an internal revolution in Berkeley, reaches its catastrophe in Hume". The exposition is fluent, and many important points made by earlier and later historians of English philosophy are well seized. The result of the whole development, the author thinks, was to show the necessity either of renouncing all secure knowledge, or else of seeking "an entirely new way". He does not say precisely what ought to be regarded as the new way; but he has some remarks at the end on the contrast between two aspects of Hume's philosophy—the negative, backward-looking, and the positive, forward-looking aspect. The problem of surmounting philosophical scepticism, Hume only acknowledged himself for the time unable to solve; he did not regard it as insuperable. And he himself attempted a psychological solution, which is in its way positive, of problems as to the origin of conceptions.

Herbert Spencer's Lehre von dem Unerkennbaren. Von ERNST GROSSE, Privatdocent an der Universität Freiburg. i. B. Leipzig: Veit, 1890. Pp. vi., 119.

An exposition (pp. 1-63) and criticism (pp. 64-119) of Mr. Spencer's theory of knowledge as set forth in *First Principles* and in *The Principles of Psychology*. The exposition is careful and well-written. The criticism is directed in detail against Mr. Spencer's "relativism". What the author aims at putting in its place is "merely a scientific rehabilitation of the view of 'common sense'." More is given, as may be seen, than is promised in the title; the doctrine of the Unknowable—against which, in particular, the author contends that religion as well as science is concerned with the Knowable—being treated simply as part of a general philosophical doctrine.

Herbert Spencer's Erziehungslehre. Eine kritische Untersuchung. Inaugural-Dissertation der philosophischen Fakultät der Universität Jena zur Erlangung der philosophischen Doktorwürde vorgelegt von FRANK M'MURRY. Gütersloh: C. Bertelsmann, 1890. Pp. 82.

It is not stated whether the author of this Inaugural Dissertation for the attainment of the degree of Doctor of Philosophy in the University of Jena has actually received the degree. To have conferred it for a production of this kind would not reflect credit on any University. Professedly it is a "critical investigation" of Mr. Spencer's educational doctrine in relation to his whole system of philosophy. The fact that the author really knows something of Mr. Spencer's works, and can when he likes write an accurate exposition of particular points and even cite relevant objections from other writers, only makes it necessary to speak of him with more plainness. The remarkable—and very unpleasant—feature of his "dissertation" is the constantly recurring, perfectly irrelevant, but to all appearances calculated, appeal to theological prejudice. The appeal is of a kind that it might have been thought had by

this time gone out of fashion even in the polemics of the street. The general spirit in which the author writes may be inferred from the assertion, many times repeated in one form or another, that for Mr. Spencer "man is merely the cleverest beast (*das klügste Tier*), not a moral being" (p. 48). The length to which he can go in particular misrepresentation becomes visible when he says (p. 7) that in Mr. Spencer's opinion "Religion in the ordinary sense, or belief in God, is pure superstition; Protestantism is a 'Hebrew myth'; the reference for the last statement being to "*Principles of Psychology*, 3rd edition, 1881, vol. i., p. 466, note". Of the controversial methods here revealed, "we must wish," as the author says of Mr. Spencer's views, "that they may find no further extension; for to the promotion of human welfare they are not adapted". It may be said with perfect truth of such methods that in them "the moral part of man finds generally little recognition".

RECEIVED also:—

- J. Croll, *The Philosophical Basis of Evolution*, Lond., E. Stanford, pp. viii., 204.
 D. Syme, *On the Modification of Organisms*, Melbourne, G. Robertson, Lond., Kegan Paul, Trench, & Co., pp. 164.
 J. Donovan, *From Lyre to Muse*, Lond., Kegan Paul, Trench, Trübner, & Co., pp. 209.
 G. Jamieson, *A New Psychology*, Edinb., A. Elliott, pp. xv., 206.
 E. Hatch, *The Influence of Greek Ideas and Usages upon the Christian Church*, Lond., Williams & Norgate, pp. xxiii., 359.
 Wm. Turner, *The Cell-theory, past and present*; and *The Convolutions of the Brain*, Lond., Williams & Norgate, pp. 44, 53.
 N. Kerr, *Should Hypnotism have a recognised place in ordinary Therapeutics*, Lond., H. K. Lewis, pp. 16.
 W. T. Harris, *Introduction to the Study of Philosophy*, New York, D. Appleton, pp. xii., 287.
 C. M. Gayley, F. N. Scott, *A Guide to the Literature of Aesthetics*, Berkeley, Univ. of California, pp. 116.
 S. Serguéyeff, *Le Sommeil et le Système nerveux*, Paris, F. Alcan, pp. xxii., 800; xx., 962.
 A. Schopenhauer, *Le Monde comme Volonté et comme Représentation* (tr. A. Burdeau), 3 Tomes, Paris, F. Alcan, pp. 438, 325, 460.
 P. Ceretti, *Sinossi dell' Enciclopedia Speculativa*, Torino, Union Tip.-Editrice, pp. lv., 222.
 P. Ceretti, *Poesie Giovanili*; and *Grullerie Poetiche*, i. Torino, V. Bona, pp. xxii., 132; xv., 310.
 S. Rubinstein, *Zur Natur der Bewegungen*, Leip., A. Edelmann, pp. 64.
 J. G. Vogt, *Das Wesen der Elektrizität*, &c., i., Leip., E. Wiese, pp. 472.
 A. Lehmann, *Die Hypnose*, Leip., O. R. Reisland, viii., 194.
 P. du Bois Reymond, *Ueber die Grundlagen der Erkenntniss*, Tübingen, H. Laupp, vii., 130.
 T. Ziehen, *Leitfaden der Physiologischen Psychologie*, Jena, G. Fischer, pp. 176.
 O. Gaupp, *Die Erkenntnisslehre H. Spencer's*, Berlin, H. Schumacher, pp. 66.

NOTICE will follow.

VIII.—FOREIGN PERIODICALS.

THE JOURNAL OF SPECULATIVE PHILOSOPHY.—Vol. xxii., Nos. 1, 2. P. Chubb—Thomas Hill Green's Philosophical and Religious Teaching. [An outline of Green's metaphysics, with some remarks on his attitude towards Christianity.] J. A. Scartazzini—The Congruence of Sins and Punishments in Dante's *Inferno* (tr.). W. T. Harris—Plato's Dialectic and Doctrine of Ideas. A. Bullinger—Hegel's Doctrine of Contradiction (tr.). S. W. Dyde—Dr. Martineau's *Idio-Psychological Ethics*. [An expository and critical article having for its indirect aim "to show that the difference between Utilitarian ethics on the one hand and on the other hand the ethics of Intuition, as represented by Dr. Martineau's *Idio-Psychological Ethics*," is not really radical, and that a possible reconciliation between these two conflicting theories is indicated now and then by Dr. Martineau himself."] Leibniz—Critique of Locke (tr.). P. Spence—The Spectrum-Spread of our Sensations. [Contents that the appearance of sensations as spatially ordered is fatal to the idealistic theory of the external world.] E. M. Mitchell—The Platonic Dialectic.

THE AMERICAN JOURNAL OF PSYCHOLOGY.—Vol. iii. No. 3. H. H. Donaldson—Anatomical Observation on the Brain and several Sense-organs of the blind deaf-mute Laura Dewey Bridgman, i. [First part of a very careful description (with illustrations) of the famous Laura's brain. The author has "applied a large number of tests to the brain, to determine, if possible, whether her peculiar mental existence, which was the result of her defective sense-organs, has left any trace on her brain, or whether such anomalies as may be observed are sufficiently explained when considered as the direct consequences of the initial defect alone". The final results, as bearing on "the inter-relation of brain-structure and intelligence," remain to be given: they should prove of no common interest.] C. F. Hodge—A Sketch of the History of Reflex Action, ii. [Two sections in continuation: the first, occupied with Bell's Law, as supported or developed by Magendie, J. Müller, and others; the second, with the physical (*versus* psychic) theory of reflex action, worked out differently by Marshall Hall, Pflüger, Lotze, &c.] J. Le Conte—On a curious Visual Phenomenon. [A short description and explanation, by this unwearied optical observer, of a peculiar visual image which he can produce on first waking from sleep by sudden and violent turning of the eyes to right or left, with closed lids. The image is of "two brilliant circles of radiating lines, surrounding each a blank space," and is held, apparently with good reason, by the observer to represent the blind spots of the two eyes in the only way in which they admit of being *directly* apprehended.] W. Noyes—A Counting-attachment for the Pendulum-chronoscope. Psychological Literature (Nervous System, Experimental, Criminology, Psychiatry, Miscellaneous). Notes.

REVUE PHILOSOPHIQUE.—An. xv., No. 10. G. Tarde—Le délit politique. [On the generalisations of Lombroso especially with reference to "political crime". Many interesting remarks are made by the way; but the central point is that Lombroso neglects social as compared with physical influences.] A. Belot—Une nouvelle théorie de la liberté. [On M. Bergson's recent *Essai sur les Données immédiates de la Conscience*.] Ch. Féré—Note sur la physiologie de l'attention. [Voluntary attention, or attention excited by representations, and reflex attention, or attention

of external origin, have the same physiological basis, *viz.*, tension of the muscular system. The parallelism of the two kinds of attention is shown by experiments. Sensory excitations of any kind augment the rapidity and energy of muscular reaction; voluntary attention has the same effect. The ordinary effect of voluntary attention, *viz.*, rapidity and energy of response, can be produced by a purely mechanical tension of muscles not immediately brought into action. The inverse effect is also produced; moderate mental activity exaggerates the energy of movements not immediately connected with it. While general tension is the necessary support of local tension, two local activities cannot be at the maximum of intensity at the same time; for the general tension that is used as its support by one of them is withdrawn from the other. General relaxation of the muscles, as has been shown experimentally, tends to suppress attention and psychical activity. "Repose" is of course not the same thing as "voluntary immobility," which involves a balance of muscular efforts, and may be taken as identical with the attitude of attention. Previous tension of the muscles (produced otherwise than voluntarily) favours not only energy and rapidity of movement, but also its precision. Here again the effect of voluntary attention is the same.] Notes et Discussions (J. Andrade—Les bases expérimentales de la géométrie. J.-J. Gourd—Sur le principe de la causalité). Analyses, &c. Rev. des Périod. No. 11. J.-P. Durand—Qu'est-ce que la physiologie générale? [A brief argument for the author's view that every animal and every plant is composed of a number of distinct "elements," each of which is the animal or plant in miniature. The human organism, for example, is "an assemblage of elementary organisms, of which each possesses all the fundamental attributes manifested by the whole". It is therefore "the seat of a colony of psychical individualities, absolutely distinct but all subordinated to a supreme chief, the central Ego, which is for them a *primus inter pares*."] E. de Hartmann—L'axiologie et ses divisions. [A distinction is drawn between the "eudæmonological" branch of "axiology"—or the doctrine of the value of ends—and other branches, in which ends are considered, not as involving more or less pleasure, but as having a "teleological-evolutionistic" significance. This distinction furnishes the ground for a defence of the author's combination of "eudæmonological pessimism" with "teleologico-evolutionistic optimism".] F. Paulhan—Le nouveau mysticisme. [Discusses the spirit of the present age, considered as in various ways a reaction from the spirit of the immediately preceding age. The reaction against naturalism and pessimism is first considered; then the influence of popular versions of "Darwinism" in promoting pessimism (which, however, had sprung up independently). Exclusive devotion to the "historical method" is viewed as a symptom of intellectual anarchy. The appeal of hypnotic experiments to the love of the marvellous is discussed. The "new mysticism," which expresses itself particularly in theosophical doctrines, is found to be also manifested in genuine philosophy. Illustrations of the mystical tendency are found also in novels and literary criticism; and, on the practical side, in socialism. The new age, while it is on one side a revival of beliefs and aspirations that had been temporarily obscured, at the same time desires a synthesis of these with the scientific aims of the immediate past. Mysticism may have its dangers; but, so long as the scientific spirit persists, all is well.] P. Regnaud—L'origine des suffixes et le mécanisme de la dérivation dans les langues indo-européennes. Rev. Gén. (P. Tannery—L'histoire du concept de matière). Analyses, &c. (J. Drummond, *Philo-Judeus*, &c.). Rev. des

Périod. No. 12. E. de Roberty—Les antinomies et les modes de l'inconnaissable dans la philosophie évolutionniste. [Concludes that a "categorical" monism such as that of Mr. Spencer, falls into the error of "taking the false negation of identity or of pure knowledge, the unknowable, for something really distinct, really separate from the knowable". A more rational agnosticism is that of thinkers like Comte, who profess a "less categorical, less affirmative" monism.] A. Binet—Perceptions d'enfants. [Further experiments on the mental powers of the two children that were the subject of M. Binet's article in *Rev. Phil.* for July (*MIND* xv. 584). Perceptions of colour were first experimented with. Yellow and green were often confounded by the younger child ($2\frac{1}{2}$ to 3 years old). "Method of recognition" being substituted, on alternate days, for Preyer's "method of appellation," it was found that (as Preyer had conjectured) the confusion is between names and not colours. The child has always more difficulty in finding the name of a given colour than the colour corresponding to a given name. The colour oftenest named is red (in Preyer's experiments it was yellow). Interpretation of "drawings" (pictures, photographs, &c.) being tested, it was found that anything which has been seen and is represented as a whole is named correctly, but that there is no recognition of separately represented parts of an object when they have not been first seen in separation. The eldest of the children ($4\frac{1}{2}$ to 5 years old) cannot interpret with certainty any pictured signs of emotional states but laughter and tears. At 3, dreams are not distinguished from other recollections; at $4\frac{1}{2}$ they are distinguished, though not without indecision at some points. The "feeling of the Ego" takes some time to form. Use of the third person for the second and the first is shown by experience to be not wholly a result of imitation. The first person is the last to be used correctly. "At three years and two months exactly the little girl for the first time makes use of the word I." When asked for the definition of an external thing ('What is so-and-so?') both children reply, when it is an object commonly used, by saying what it is used for, and in the case of other objects usually by some analogous answer.] *Rev. Gén.* (M. Vernes—Histoire et philosophie religieuses). Notes et Discussions (G. Lechalas—Les bases expérimentales de la géométrie. A. Lalande—Sur la causalité). Analyses, &c. *Rev. des Périod.*

RIVISTA ITALIANA DI FILOSOFIA.—An. v. 2, No. 2. L. Pietrobbono—Della percezione del corpo umano. [An argument for the doctrine of a primitive "perception of the body" as held by Rosmini. "Perception" is necessarily bound up with the "feeling of the body," which is generally recognised by modern psychologists. The original "perception" is not at first differentiated into special perceptions, but gradually becomes so.] P. Ceretti—Idee pedagogiche. [A posthumous essay, with brief introduction by Prof. Pasquale d'Ereole.] V. Benini—Dell' attenzione. [Written with reference to Prof. Ribot's *Psychologie de l'Attention*.] S. Ferrari—La scuola e la filosofia pitagoriche (v.). [On the relations of Pythagoreanism with posterior Greek schools and with modern philosophy. "If the worth of a system is to be measured by the truth which it has introduced into science and by the number of germs that have survived and been transplanted into other systems, then it must be recognised that time and history establish the importance and greatness of the Pythagorean philosophy." Bibliografia, &c. No. 3. L. Credaro—Il presente della storia della filosofia. [On the desirability of treating the history of philosophy in relation to natural and social circumstances, and not in isolation from the history of the special sciences, of religion,

&c. At present the periods that most need study are the pre-Socratic and post-Aristotelian periods.] A. Piazzi—La pedagogia di Jacopo Sadoletto. L. Pietrobono—Della percezione del corpo umano (ii.). [On theories of the genesis of spatial representations. Space can best be derived psychologically from "organic perception" or "the feeling of the body".] Bibliografia, &c.

RIVISTA DI FILOSOFIA SCIENTIFICA.—Vol. ix, Nos. 3-6. [These Nos. having, through miscarriage or other accident, failed to come to hand at the proper time, it is not possible now to do more than give their mere contents.] No. 3. B. Labanca—Difficoltà antiche e nuove degli studi religiosi in Italia. G. Marchesini—La rappresentazione nell'istinto. Riv. Anal. Rasseg. Bibl., &c. No. 4. G. Fano—Di alcuni fondamenti fisiologici del pensiero. G. Cesca—La storia della filosofia. A. Capelli—La matematica nella sintesi delle scienze. Riv. Anal. (A. R. Wallace, *Darwinism*), &c. No. 5. F. Pietropaolo—Scienza e religione. M. Pilo—L'analisi estetica. F. S. Monticelli—Il parassitismo animale. Note Critiche (F. de Sarlo—L'idea dell'anima, e la psicologia), &c. No. 6. A. Agrestini—L'unità della materia. G. Dandolo—La dottrina della memoria nel sensualismo e materialismo francese, &c.

PHILOSOPHISCHE MONATSHEFTE.—Bd. xxvi., Heft 9, 10. J. Zahlfleisch—Das natürliche Denken auf Grund des Analogieschlusses. ["A contribution to the reform of logic."] A. Baur—Eduard Zeller als Religionsphilosoph. ["A contribution to the history and criticism of modern philosophy of religion." The development of Zeller's view of religion is brought into connexion with the development of his general philosophical view; a "first period," under Hegelian influence, being distinguished from a "second period," marked by a return to Kant. In the first period religion is not appreciated on all its sides, but merely from the intellectual point of view, as containing the symbolic expression of a philosophical doctrine. In the second period, consistently with the spirit of the critical philosophy, it is viewed more as an independent phenomenon not to be exhausted by the exclusively intellectual view.] Recension. Litteraturbericht, &c. (W. Cook, *The Ethics of Bishop Butler and Immanuel Kant*, &c.).

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE.—Bd. xiv., Heft 3. C. v. Ehrenfels—Ueber "Gestaltqualitäten". [Discussion of some points in E. Mach's *Beiträge zur Analyse der Empfindungen* (1886).] H. Höfding—Ueber Wiederkennen, Association und psychische Activität (Schluss). [The special subject of the present article is "psychical activity". This, interpreted as "attention" or "will," the author is disposed to look upon as essential to all mental life. From "formal will," in which the essence of all consciousness consists, "real will" is to be distinguished. Attention announces itself in consciousness by "sensations of movement"—external or internal according as sense-stimulations or representations are attended to. "Activity" is not a quality attached to simple states of consciousness; for self-perception does not tell us where activity ends and passivity begins; in self-perception we discover the results of activity, not activity itself. Everywhere present in higher or lower degree, psychical activity is perhaps indefinable.] B. Kerry—Ueber Anschauung und ihre psychische Verarbeitung (vii.). J. Petzoldt—Maxima, Minima und Oekonomie (ii.). Anzeige. Selbstanzeigen, &c.

ARCHIV FÜR GESCHICHTE DER PHILOSOPHIE.—Bd. iv., Heft 1. P. Tannery—Une opinion faussement attribuée à Pythagore. [The common

source of the attribution to Pythagoras by Pliny and Censorinus (1) of an evaluation of the moon's distance in stadia, and (2) of the application of his doctrine of the harmony of the spheres to determining the distances of the planets, is Varro, who himself probably depended on Greek sources of very recent date.] M. Offner—Zur Beurteilung des Melissus. [Melissus was not really guilty of the argument attributed to him by modern historians, that because the whole is unlimited in time it must be infinite in extent. The argument is one that it is not likely he would have used; there is no trace of it in the fragments; the authority for its ascription is insufficient; finally, it can be shown that the misunderstanding probably originated *after* Aristotle and *before* Themistius.] A. Döring—Die Disposition von Xenophons Memorabilien als Hilfsmittel positiver Kritik. [A defence of the genuineness and organic character of the *Memorabilia* against some recent critics.] Th. Achelis—Das Zweckprincip in der modernen Philosophie. [Cites authorities, during the present century, against the rejection of final causes, especially in the sciences of organic life.] J. P. N. Land—Arnold Geulinx und die Gesamtausgabe seiner Werke. [See p. 160, below.] Jahresbericht (H. Diels, E. Zeller, P. Wendland, B. Erdmann). Neueste Erscheinungen.

PHILOSOPHISCHES JAHRBUCH.—Bd. iii., Heft 4. Hayd—Vereinbarkeit oder Unvereinbarkeit unbeschränkter Freiheit der wissenschaftlichen Forschung mit einem dogmatisch bestimmten Glaubensbekenntniss (Schluss). [No sharp line can be drawn between knowledge and belief. Some conception is a condition of belief as of knowledge. Reason must be able to conceive that which has to be believed as at least "possible," and not only as possible but as "reasonable," that is to say, fitting into a rational system of philosophy and supplying the defects of knowledge. The objects of supernatural faith also are not exempt from the laws of formation of concepts; for they can be continually better conceived and understood.] E. Kadeřávek—Ueber die Einführung der christlichen oder aristotelisch-thomistischen Philosophie an den philosophischen Facultäten (Schluss). F. X. Pfeifer—Analogien zwischen Naturerkenntniss und Gotteserkenntniss, den Beweisen für Gottes Dasein und naturwissenschaftlicher Beweisführung, mit Bezugnahme auf Kant's Kritik der Gottesbeweise (i.). [Chiefly an argument against Kant's criticism of the "cosmological" proofs of the existence of God. According to Kant, the inference of causes is only valid within the world. But scientific men proceed according to the principle that in all cases where a fact is not explicable from the causes within a determinate sphere, a cause lying outside that sphere must be assumed. In the proof of the existence of God from the law of causation, the determinate sphere that does not contain within itself causes sufficient to explain the given facts is the whole world; consequently the principle requires a supramundane cause.] M. Sierp—Pascal's Stellung zum Skepticismus (Schluss). Recensionen und Referate (F. E. Abbot, *The Way out of Agnosticism*, &c.). Philosophischer Sprechsaal (N. Kaufmann—Erwiderung auf die Kritik der thomistischen Erkenntnisslehre). Zeitschriftenschau. Miscellen und Nachrichten.

ZEITSCHRIFT FÜR PSYCHOLOGIE U. PHYSIOLOGIE DER SINNESORGANE.—Bd. i., Heft 4, 5. J. v. Kries—Ueber das Erkennen der Schallrichtung. [An account of some new experiments on the perception of sound-direction, devised with reference to the recent rehabilitation by Preyer, and also (in different and independent fashion) by Münsterberg, of the earlier view that it is effected by means, or at least with help, of the semi-circular canals. The author puts forward his experiments with a view

not so much to any definitive result as to showing how variable the conditions of the perception are.] Th. Lipps—Zur Psychologie der Causalität. [A very elaborate attempt (pp. 48) by the author of *Die Grundthatsachen des Seelenlebens* to reduce Causality to Association, and the Law of Causation to the Law of Association.] K. L. Schaefer—Zur interaurealen Localisation diotischer Wahrnehmungen. [Experimental examination of a special question arising out of the author's paper on "Perception and Localisation of Fluctuations and Difference-tones" in the previous No.] R. Wahle—Zur Psychologie der Frage. [Analysis by the author of *Gehirn u. Bewusstsein* (See MIND x. 151), of the complex mental attitude assumed in the different forms of interrogatory expectation.] H. Ebbinghaus—Ueber negative Empfindungswerte, i. [First half of a discussion joining on to Fechner's posthumous letters on the subject given in Nos. 1, 2, and pointed with reference to the later psychophysical work of Delboeuf, Münsterberg and others.] Versammlungen. [Accounts of proceedings in the ophthalmic and aural sections of the recent Medical Congress at Berlin.] Litteraturbericht. Bibliographie der psychophysiologischen Litteratur des Jahres 1889, [A first attempt at an exhaustive catalogue of a whole year's "psychophysiological" literature, disposed into 14 sections and covering 55 pp.]

VOPROSY PHILOSOFII I PSICOLOGII (PROBLEMS OF PHILOSOPHY AND PSYCHOLOGY).—Vol. i., Nos. 2-4. [Professor N. Grot, of Moscow, editor of this quarterly, of which No. 1 was noticed at length in MIND xv. 154, has kindly given the following English rendering of the main contents of the succeeding Nos.] E. Radlof—On the relations between Voltaire and Rousseau (i.). N. Twanzof—The relation of philosophy and science. L. Lopatin—The ethical problem in contemporary philosophy. N. Zwierof—On the freedom of will. N. Grot—What is metaphysics? N. Sziszkin—Psychophysics from the point of view of a mechanical theory. N. Owsiamriko Kulikowsky—Essays on the history of mind. A. Tokarsky—On the Hypnotical Congress at Paris. N. Bazanof—The Second Congress of Anthropological Criminology. Critical Notices. Bibliography. No. 3: O. Gerasimof—An essay on the psychological evolution of Lermontof. W. Lutoslawski—On the importance and the aims of the history of philosophy. L. Lopatin—Criticism of the empirical principles of ethics. T. Twanzof—On the artistic theories of S. A. Usuf. Sziszkin—Psychophysics from the point of view of mechanical theory. S. Trubezkoy—On the nature of human consciousness. W. Rosanof—On the chief currents of Russian philosophy. A. Kozlof—An essay on the life and philosophy of Leibniz. Critical Notices. (Howard Collins, *An Epitome of the Synthetic Philosophy*, &c.). Bibliography. No. 4: E. Trubezkoy—The political ideal of Plato and Aristotle and their historical importance. E. Radlof—On the relations between Voltaire and Rousseau (ii.). L. Lopatin—The ethics of Kant. A. Tokarsky—On the pedagogical importance of hypnotism. N. Karejew—On the freedom of will from the point of view of historical evolution. N. Grot—On the more important aims of psychology. N. Lange—On the elements of will. W. W. Rosanof—On the struggle with Western Europe. P. E. Astafief—On the ethics of Count L. N. Tolstoi and his critics. Critical Notices (J. Venn, *The Principles of Empirical or Inductive Logic*, &c.). Appendix (Kolubowsky—Materials for a history of Russian philosophy. The Society of Psychological Research at Moscow).

IX.—NOTES.

REPORT OF THE INTERNATIONAL CONGRESS OF PHYSIOLOGICAL PSYCHOLOGY.¹

The official Report of the International Congress of Physiological Psychology, held at Paris in 1889 (and next to be held at London in 1892) having now appeared, it becomes possible to supplement Prof. W. James's account given at the time (*MIND* xiv. 614) by further details. The division of work amongst the Sections, and the discussions in their general features, have been already described. Referring for this to Prof. James's account, we may now draw attention to the more definite among the proposals or conclusions, not already remarked on, that are embodied in the fuller report.

Prof. Charles Richet brought forward the question of "the terminology of Hypnotism". The propositions accepted were that the term "animal magnetism" should be reserved for a science that may explain the phenomena otherwise than by "suggestion," and "hypnotism" for the explanation of them by "suggestion, auto-suggestion, and analogous reactions of the 'subject' upon himself". Practically, in the sessions of the Congress, the name of "hypnotism" was applied to all the phenomena, theories apart. As to the kind of 'subjects' susceptible of being hypnotised and the cause of the hypnotic state, M. Bernheim, representing the Nancy school, contended that nearly all persons are susceptible, that the phenomena indicate nothing morbid, and that they are wholly due to the psychical influences generally called "suggestion"; while M. Babinski, expounding the views of the Salpêtrière school, maintained that although susceptibility to hypnotism may exist in germ in all persons, yet, for the tendency to realise itself, some pathological modification must be at least "imminent," that hypnotism in its most perfect form must be regarded as a pathological state, and that, while "suggestion" is a true cause, it is not the only source of hypnotic phenomena, the most important source being "peripheral excitations". By Prof. Janet "distraction" is regarded as a predisposing condition; Prof. Delboeuf ascribes the same function to "attention". The question of hypnotism in relation to "double personality," &c., was discussed by Herr Dessoir, who would define the hypnotic state as a "preponderance of the secondary (*i.e.*, lower or "automatic") Ego produced artificially". M. Danilewsky described some successful attempts to hypnotise animals. The essential thing is to place and keep them in an abnormal position. Voluntary movements are then paralysed; the animal feels itself powerless, and becomes (till reaction) a passive instrument in the hands of the operator.

A point on which almost as much difference of opinion manifested itself as on hypnotism is the question of "Attention". In Prof. Ribot's monograph it is viewed as determined by "affective states". M. Marillier, in opposition to this view, would define it as a "state of relative mono-ideism," or very great preponderance in intensity of a single idea ("absolute mono-ideism" being unconsciousness). Prof. Richet would distinguish active, voluntary attention from mere passive attention to "fixed ideas" &c. Prof. Delboeuf would call "passive attention," which is involuntary, "obsession," and would limit the term

¹ *Congrès International de Psychologie Physiologique. Première Session. Paris, 1890. Compte rendu présenté par la Société de Psychologie Physiologique de Paris. Paris: Bureau des Revues, 1890. Pp. 159.*

"attention" to states that include a voluntary element. M. Espinas insisted on the importance of the element of muscular feeling in states of active attention. Against M. Marillier's view that in the state itself "intensity" is everything, though the intensity of an idea may depend on various causes, he pointed out that great intensity often prevents attention. A medium intensity is best; but this must be accompanied by "represented motor phenomena," on which chiefly attention depends. One determinant of attention is "curiosity"—which may be noticed in animals. M. Marillier's reply was that it is when we are *trying* to pay attention that muscular effort is present; when the state of attention is established, the effort has disappeared.

Reporting on Psychological Heredity, Mr. Galton remarked that the most important question now is whether acquired habits are inherited. Experiments, as he showed, must be on animals; otherwise the social factor could hardly be eliminated. Some methods of experiment on oviparous animals were proposed. As regards human heredity, he remarked, the only point on which he had something new to suggest was "the necessity of limiting observation to the three degrees or groups: *filial*, *paternal*, and *maternal*, and of bringing special attention to bear on the cases in which the members (brothers and sisters) of those groups are numerous."

Two sets of experiments on animals (in addition to those connected with hypnotism) were described. Prof. Richet described a case of "psychical blindness" produced in a dog by removal of "the grey envelope of the occipital convolutions". After the operation, the animal still sees things perfectly as obstacles, but no longer as prey. Prof. Herzen, having referred to the observed results of extirpation of the excitable regions of the cerebral cortex in newly born animals, went on to ask whether, as is ordinarily supposed, recovery from all effects of the operation can be due to the taking up of the function of the extirpated centre by the corresponding centre in the opposite hemisphere. This, he concludes, can hardly be so; for there is also complete recovery of function after subsequent extirpation of the corresponding opposite region. Rather, he would assume provisionally a "subaltern centre," which, already there, develops itself further in the absence of the superior centre. "The more considerable development of that centre would produce a greater development in the corresponding centre of the opposite side; so that the superior centre, of the other side, becomes subaltern and its extirpation produces no effect."

Differences of opinion were not wanting on questions of principle as well as detail; as will be readily understood when it is mentioned that Prof. Grote (of Moscow) argued at some length that an attempt should be made to fix the metaphysical basis of researches in physiological psychology, and himself propounded a theory of spiritualistic dualism; and that M. Alliot asked why the identity of the nervous and electric "fluids" should not be admitted as a working hypothesis to explain "suggestion."

For the future, the name, "Congress of *Experimental Psychology*" was adopted in preference to "Congress of *Physiological Psychology*". Congress of "Psychology," simply, was proposed; and this would seem not inappropriate to the varied lines of research indicated by Prof. Ribot in his opening address to the Congress: "Animal psychology, linguistic, history of words, become our guides in a region where the aid of physiology almost completely fails us". This was said in reference to the question of "abstract or general ideas"; and allusion was made to other questions of the kind.

Dr. McCosh sends the following on "The Office of Induction in Fundamental Philosophy," not without reference to Mr. Carveth Read's review of his *First and Fundamental Truths* in *MIND* xv. 100:—

"I have had great difficulty in getting a hearing for one point in my philosophic views. In the discovery of a *a priori* truth I allot an important function to inductive observation. This seems to identify me with the empiricists, from whom I entirely separate myself. I hold that there is no induction in the spontaneous exercise of intuition; it sees the object at once. But if we, as metaphysicians, express the law in a general form or law, we need to proceed by a careful observation, the facts being given us by self-consciousness. We have to inquire what is the precise *a priori* law, say of causation, as it manifests itself. If we neglect to do this, there is a great risk of presenting the principle in a mutilated, which is, so far, an erroneous form. The vagaries of metaphysicians commonly spring from an imperfect induction. But in calling in induction we do not give it an authoritative or guaranteeing office. Induction merely lets us know what the law in the mind is; it does not give it its imperativeness. It needs anxious inspection to find what the law of causation is, but the law operates whether we observe it or not. This distinction is easily understood by those disposed to give their attention. It saves me from the inconsistency and the imbecility with which I have been charged, in a recent criticism. It gives to reason and to observation each its proper place in the construction of fundamental philosophy. It may be made the means of reconciling the Scotch and German philosophies."

The last quarter of 1889 has seen the first appearance of not less than three new quarterly periodicals, in English, dealing in different ways with philosophical subjects: (1) *The Critical Review of Theological and Philosophical Literature*; (2) *The International Journal of Ethics*; (3) *The Monist*.

(1) *The Critical Review* hails from Edinburgh (T. & T. Clark), and is edited by the Rev. Prof. S. D. F. Salmond. It is designed to furnish a critical survey of current literature in Theology, with notice also of philosophical and other writings so far as related to theological questions. Among over twenty books reviewed at greater or less length in No. 1, three or four are philosophical; chief of these, the recent translation of *Erdmann*, taken in hand by Dr. J. H. Stirling.

(2) *The International Journal of Ethics* is published concurrently in London (T. Fisher Unwin) and in Philadelphia, with Philadelphia as headquarters. It is managed by an Editorial Committee, consisting of three Americans (Dr. F. Adler, Prof. J. Royce, and Dr. S. Coit, now settled in London), two Englishmen (Mr. J. S. Mackenzie and Mr. J. H. Muirhead), and two continental professors (G. v. Giżycki of Berlin and F. Jodl of Prague); and will be "devoted to the Advancement of Ethical Knowledge and Practice". Among the varied contents of No. 1 may be specially noted: "The Morality of Strife," by Prof. H. Sidgwick; "The Law of Relativity in Ethics," by Prof. H. Höfding of Copenhagen; an examination of Abbot's *Way out of Agnosticism*, by Prof. J. Royce; and a series of short book-notices by Prof. v. Giżycki (in one of which, on the fourth edition of *The Methods of Ethics*, he declares that he must repeat "the very serious reproach," three times before made, "that, *without sufficient reason*, Prof. Sidgwick affirms 'a fundamental contradiction in ethics,' abandons the independence of morality, and opens the door to moral scepticism").

(3) *The Monist*, from Chicago (Open Court Publishing Co.), is to be concerned with "Philosophy, Religion, Science and Sociology," and will "continue a certain portion of the work hitherto done by *The Open Court*"

(weekly). It is called *The Monist*, apparently, because its promoters believe that "the thinkers of mankind, whatever may be their philosophical or religious views, are working, everyone in his own province, at one and the same great problem, which is a unitary conception of the world—free from contradictions, and based upon the facts of life". The words apply to Philosophy in general hardly less than to Monism in particular. Accordingly, the pages of the new quarterly are to be "open to every competent exposition of the results of philosophical inquiry,"—and not of philosophical only. In No. 1 about half of the articles are over the border. The others are: "The Analysis of Sensations—Antimetaphysical," by Prof. E. Mach; "The Origin of Mind," by Dr. P. Carus; "The Magic Mirror" (study of various forms of clairvoyance), by M. Dessoir; and "Höfding on the Relation of the Mind to the Body," by W. M. Salter.

Prof. J. P. N. Land of Leyden, who (with J. van Vloten) edited in 1882-3, for the Spinoza Memorial Committee, the stately two volumes of *Opera*, is now, after long preparation, engaged on the task of bringing out, in like form, a collected edition (in 3 vols.) of the works of Arnold Geulincx. A balance left over from the fund collected for the Spinoza Memorial (statue as well as edition of works) has been devoted by the committee to this purpose; and the money could in no way be so appropriately bestowed as in promoting this long-neglected service to the fame of Spinoza's great Flemish contemporary, who, like himself, came early to the end of a life not too fortunate. Prof. Land has written in the last No. of the *Archiv f. Gesch. d. Philosophie* (see above, p. 155) an article on Geulincx and the proposed edition of his works. It contains so much information about a thinker who is far too little known in this country, that permission has been sought and obtained to have it translated for the next No. of *MIND*.

THE ARISTOTELIAN SOCIETY FOR THE SYSTEMATIC STUDY OF PHILOSOPHY (22 Albermarle Street, W.). The Twelfth Session began on Monday, Nov. 3, when the President gave an Address on "The Laws of Association". Subsequent meetings—Nov. 17, Mr. R. B. Haldane on "The Categories of Scientific Method"; Dec. 1, Mr. B. Bosanquet V.-P. "On the main outlines of Hellenic Theory concerning the Beautiful". Both papers were followed by discussion.

CORRECTIONS. (1) The Rev. J. M. Robertson of St. Ninian's, Stirling, has noted, in the most important of the newly discovered Letters of Hobbes reprinted in *MIND* xv. 440-7, an error overlooked both here and by the original transcriber, Dr. F. Tönnies. The word "otium" in the last line but one of p. 445 gives no sense: Mr. Robertson suggests "etiam" instead, with obvious propriety, and the more if a comma is inserted after the following word "odiose".

(2) In the first paragraph of Mrs. Ladd Franklin's review of Miss Jones's *Elements of Logic* in *MIND* No. 60, p. 559, it was, by some accident, wrongly stated that so large a relative number as "thirty-six" pages were given to the single discussion of "Existence and a Limited Universe". No more than 16 pp. are given to what Miss Jones calls 'Predication and Existence,' and the subject of "Existence and a Limited Universe" is not treated by her outside of these. On the other hand, the "four" pages which the reviewer said were all that Miss Jones gave "to the whole subject of Induction" should be doubled to about 8 pp., when her various other references to the subject are reckoned, beyond that four-page 'Note on the Ground of Induction,' which Mrs. Franklin appears to have alone regarded.